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ABSTRACT

Medical Assisting Reading Strategies is one of five instructional guides in the Reading Strategies in Vocational Education Series. Developed to assist teachers working with students considered disadvantaged because of reading deficiency, the guide contains several strategies, suitable for adaptation, specifically related to medical assisting instruction. Each of six sections into which the guide is divided contains informational material and extensive examples and exercises. Section 1 concerns readability and gives procedures and guidelines for method and number of samples to collect. Section 2 briefly describes the Cloze procedure and its usefulness as a reading test and as a teaching technique for the theory of case grammar. The following four sections each present a set of important reading skills: Basic Vocabulary Skills, Paragraph Comprehension, SQ4R (Survey, Question, Read, Record, Recite, Review), and Recognizing and Recording Complex Information. Each skill is broken down into segments requiring no more than 5-10 minutes of class time every other day. Homework utilizes text assignments normally required. Following individual skill discussions is the part, Textbook Application, where each skill is applied to the course's own textbook. Each section ends with additional suggestions for teaching the new skills. (A time frame is provided for teaching the skills.) (YLB)

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MEDICAL ASSISTING
READING STRATEGIES

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1980

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FORWARD

Education amendments in 1976 (P.L. 94-482) provide for special assistance to a wide variety of students with "special needs." The special needs of these students are derived from conditions of the students which are believed to inhibit success in vocational programs. Both handicapped and disadvantaged individuals are to be served by the legislative provisions.

Academically disadvantaged students are those individuals who, because of math, reading, or communication deficiencies, may not be able to succeed in vocational programs. Legislation has provided for research and development projects to address the needs of these individuals. The projects in progress have been designed to respond to that call for research and development.

This instructional guide was developed for the purpose of assisting Medical Assisting teachers in their work with students who are considered disadvantaged because of reading deficiency. It was developed as a result of vocational reading research at The Pennsylvania State University. The guide is intended to be presented at workshops in 1980 funded by the Pennsylvania Department of Education.

"Medical Assisting Reading Strategies" have been developed according to certain distinct characteristics of reading requirements in vocational education:

(1) Reading is a vocational skill, one that requires reading abilities that differ from those associated with general literacy.

(2) There is a difference between curricular literature (textbooks and other literature which must be read in the context of student status) and occupational literature (manufacturers instructions, codes, specifications, safety warnings, etc.).

(3) Occupational reading skills are appropriately addressed in the vocational curriculum.

(4) There are strategies available to vocational teachers which need little or no reading specialization.

(5) Available strategies reflect the unique qualities of vocational reading, address general vocational reading skill requirements, and are useful for helping students disadvantaged because of reading deficiencies.

This guide is NOT intended to be envisioned as the final word in reading strategies. It contains examples of several strategies believed to be useful for the vocational instructor seeking methods that are specifically related to "medical assisting" instruction. The instructors are responsible for taking these examples and applying them to their occupational specialties. Not all of the methods will work for all Medical Assisting teachers or their

respective students. The methods were designed to be adapted, not rigidly adhered to.

Companion R & D projects at Penn State will provide useful complementary aids. An Employability Skills Curriculum Guide (Wircenski, McPherson, Feng, 1980) will soon be available. That guide addresses socialization, financial management, values clarification, job procurement, and communication skills. Four other occupational specialties (Carpentry, Cosmetology, Data Processing, and Radio and Television) will be the bases for reading strategy guides (Thornton, 1980). These guides will focus more specifically on the individual occupational areas utilizing a format similar to the Medical Assisting guide.

Field testing during 1980-81 school year is expected to result in additional refinements of the several reading strategies. Criticism and recommendations are invited by all who receive these materials. Correspondence should be addressed to

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L. Jay Thornton
Project Director
1980

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The Reading Strategies in Vocational Education Series, of which this book is one part, has resulted from research conducted by the Division of Occupational and Vocational Studies, The Pennsylvania State University and the Bureau of Vocational Education, Pennsylvania Department of Education. Many people, not expressly identified as part of the project, have served willingly in the dispatch of its objectives. Appreciation is expecially expressed to Mr. Wayne Grubb, Consultant for Disadvantaged and Handicapped, Bureau of Vocational Education, Pennsylvania Department of Education, for his support and procedural advice.

Fifteen Area Vocational-Technical Schools in the Center Region of Pennsylvania participated in the development of the series. Scores of manufacturers, publishers, and employers provided literature and information. A listing of the schools, manufacturers, publishers, and employers follows. The project would have been impossible without their help.

Two research efforts provided considerable information toward the development of the series. The first, Basic Reading Skills and Vocational Education, was published by The National Center for Research In Vocational Education under the auspices of the Knowledge Transformation Project. That publication was supervised by Dr. Carol P. Kowle. The second, Review and Synthesis of Reading in Vocational

Education, was published by the Division of Occupational and Vocational Studies in conjunction with the Division of Education Administration Policy Studies and The Pennsylvania Department of Education. Both titles are available directly from their respective publishers.

Appreciation is expressed to Mrs. Laura Frye for her careful attention to the typing and proofreading of not only the final drafts of each title in the series, but all the preliminary work and intervening drafts required. The secretarial assistance of Rosann Moore, Peggy Kresovich and Sharon Brode in the typing of manuscripts is especially appreciated.

DISCLAIMER

The activity which is the subject of this report was supported in whole or in part by the U. S. Office of Education, Department of Health, Education, and Welfare. However, the opinions expressed herein do not necessarily reflect the position or policy of the U. S. Office of Education, and no official endorsement by the U. S. Office of Education should be inferred.

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TABLE OF CONTENTS

	Page
FORWARD	iii
ACKNOWLEDGEMENTS	vii
DISCLAIMER	ix
LIST OF PARTICIPATING SCHOOLS	x
LIST OF PARTICIPATING MANUFACTURERS AND EMPLOYERS	xi
LIST OF PARTICIPATING PUBLISHERS	xii
LIST OF FIGURES	xv
Section	
I. READABILITY	1
Readability Procedures	4
Exercise 1	24
Samples: How Selected and How Many	30
Exercise 2	32
II. CLOZE PROCEDURE	35
Student Reading Ability	37
Exercise 3	76
Case Grammar and the Cloze Procedure	80
Exercise 4	82
III. BASIC VOCABULARY SKILLS	89
Formal Definitions	91
Exercise 5	92
Synonyms	93
Exercise 6	93
Illustrations	94
Exercise 7	95
Glossaries	97
Educated Guessing	98
Exercise 8	98
Exercise 9: Textbook Application	99
Teaching Students Vocabulary Skills	102

TABLE OF CONTENTS (Continued)

Section		Page
IV.	PARAGRAPH COMPREHENSION	105
	Paragraph Subject	108
	Exercise 10	109
	Paragraph Main Idea	110
	Exercise 11	110
	Paragraph Comprehension and Illustrations	113
	Exercise 12: Textbook Application.	116
	Teaching Students to Understand the Paragraph	119
V.	EFFECTIVE READING TECHNIQUE	121
	The SQ4R Method of Study.	123
	Exercise 13: Textbook Application.	125
	Teaching SQ4R	126
VI.	RECOGNIZING AND RECORDING COMPLEX INFORMATION	129
	Classification.	131
	Exercise 14	134
	Comparison.	137
	Exercise 15	142
	Cause and Effect.	144
	Exercise 16	145
	Exercise 17: Textbook Application.	148
	Teaching Students to Recognize and Record Complex Information	149
	REFERENCE NOTES	150
	REFERENCES.	151

LIST OF FIGURES

		Page
Figure 1:	Sample Readability Graph	7
Figure 2:	Graph for Estimating Readability	9
Figure 3:	Flesh Readability Formula Procedure.	13
Figure 4:	Flesh Readability Procedure Form	15
Figure 5:	Sample With Word Count Over Words.	19
Figure 6:	Sample Text With Syllables Marked.	23
Figure 7:	Sample Graphs of GRL - Frequencies: 3, 6, 10, 15 Samples	31
Figure 8:	Readability Record	33
Figure 9:	Ethylene Oxide Sterilization Cloze Test. . .	39
Figure 10:	Chair Operation Manual Cloze Test.	47
Figure 11:	Treatment Cabinet Operation Cloze Test . . .	53
Figure 12:	Grievance Procedure Cloze Test	61
Figure 13:	Injections Cloze Test.	69
Figure 14:	Illustrations.	114
Figure 15:	Illustrations.	115
Figure 16:	Non-Sequential Illustration.	117
Figure 17:	Modified Outline Charts.	135
Figure 18:	Comparison Charts.	139
Figure 19:	Comparison Chart	141
Figure 20:	Cause and Effect Charts.	146

SECTION 1
READABILITY

In order to plan for intervening in situations of reading deficiency, several pieces of information are required. First, it must be known how urgent the need to read really is, in the context of both curriculum and occupational requirements. This does not suggest that reading, in the general literacy sense, may not be important. Educators clearly recognize that reading ability is crucial if learning is to occur. What this first question addresses is an examination of objectives and their component tasks to ascertain how much reading is required to complete the tasks and, ultimately, the objectives of the course.

Although there has been no research to date to distinguish between curricular and occupational reading requirements (Reference Note[1]) it is not difficult to visualize differences between textbook reading and, for example, manufacturers maintenance manuals.

When Cooper and Bredow in their text, The Medical Assistant (1978) directed students that "Modern autoclaves are highly automated, and each model will have its own instructions for operation, care, and maintenance, which should be followed precisely," it was intended that the student read those instructions. That directive identifies two kinds of reading: that which is required to read the textbook (curricular) and that required to read the manufacturer's instructions (occupational). Previous research (A.D.W. Smith, 1974; Thornton, 1977; Thornton, 1979; Thornton, 1980) suggests that there could be significant differences in the readability level of sections of textbooks dealing with specific tasks and the readability level of literature pertaining to the performance of those tasks.

It is a fact that reading literature peculiar to an occupational specialty at least implies that some form of reading is a vocational skill. Thus, the second bit of information must be collected. It must be known (or decided) if the teacher, the school, and the school district intend to address reading within the vocational curriculum or as prerequisite skill. If reading is to be dealt with in the vocational curriculum, then all students must receive some form of vocational reading instruction. If, however, reading skill is envisioned to be prerequisite then the thrust of reading in vocational settings would be toward dealing with deficiences. The strategies, in the latter situation, would be individualized and delivered on a case by case basis.

The previous two pieces of procedural information are fairly general; the third and fourth are specific. The third deals with how difficult literature in a specific occupational curriculum is to read. What is the readability level? The fourth deals with how able students are in terms of reading ability. Can students read literature necessary to succeed in a vocational program? We shall deal with these issues separately.

Readability Procedures

Readability procedures are devices to estimate the grade reading level (GRL) of selected pieces of literature. In other words, a readability analysis determines the approximate GRL a person must possess in order to read the literature analyzed. Not the underlining of estimate and approximate. It must be cautioned

that, although these procedures have been validated by extensive research, they are not the sole determinants of readability. Muncrief (1975) discussed a variety of other considerations that are involved in readability assessments. For our purposes of matching literature assessment to student ability an index of readability is a useful measure.

There is a second caution needed about readability procedures. Preliminary results of current research (Reference Note[2]) brings up serious questions about trying to find an average readability level of occupational literature. For example, what does it mean that the average (the word "mean" is normally substituted for the word "average") readability level of a textbook is ninth (9th) grade? Because the word average or mean is used, it can be assumed that some of the literature is higher than ninth and some of it lower. What the average does not tell us is the range of readability levels and the concentration (mode at any level) of readability level.

In order to make sense out of that argument, a little must be known of how readability assessments are done. When analyzing a textbook (or any other lengthy piece of literature) random samples are selected. These samples are analyzed and an average of all of their readability levels is calculated. That average is the mean readability level of the literature. We will get more explicit about how this is done in the next section.

To point out the problem with using the mean (average) some hypothetical samples have been graphed below. The graphs show the

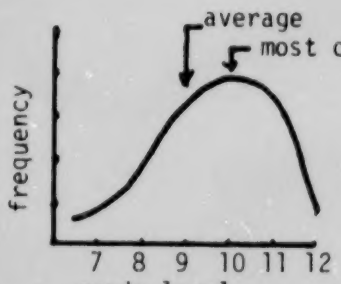
curve which would result if the frequencies of grade level of samples were plotted on the graph. The vertical axis of the graphs represents the frequency that samples were found to be at a particular grade level. The horizontal axis represents the specific grade levels. (See Figure 1)

All of the preceding graphs are of books at the ninth grade readability level. But they all differ in the concentration (mode) of levels. The point here is simply that the mean or average can be a deceptive statistic. The analysis can still be useful, providing the results include the range and distribution of readability scores sampled.

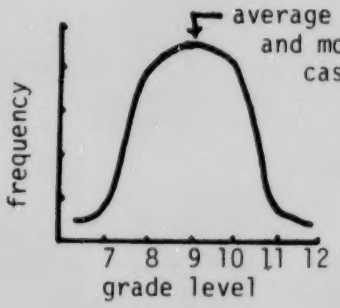
Two readability procedures will be discussed: (1) Fry procedure (See Figure 2); and (2) Flesh procedure (See Figure 3).

A form for calculating has been included to simplify the Flesh Formula calculations. (See Figure 4)

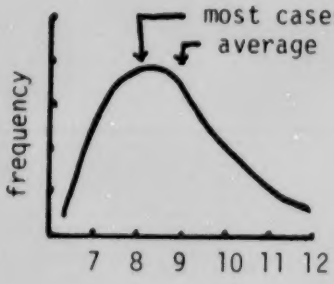
Figure 1: Sample Readability Graph



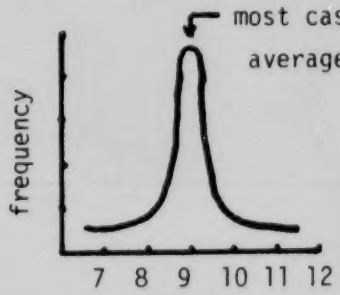
(most cases above 9th)



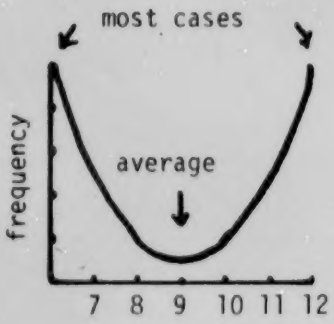
(most cases at 9th
substantial variability



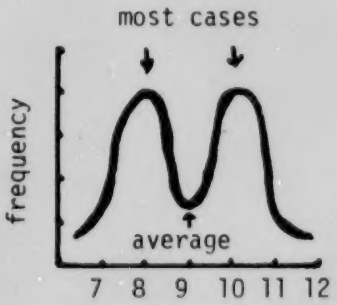
(most cases below 9th)



(most cases at 9th
slight variability)



(most cases at highest
and lowest levels)



(most cases one grade
higher and lower than
average)

Figure 2: GRAPH FOR ESTIMATING READABILITY
by Edward Fry, Rutgers University Reading Center, New Jersey
Average number of syllables per 100 words

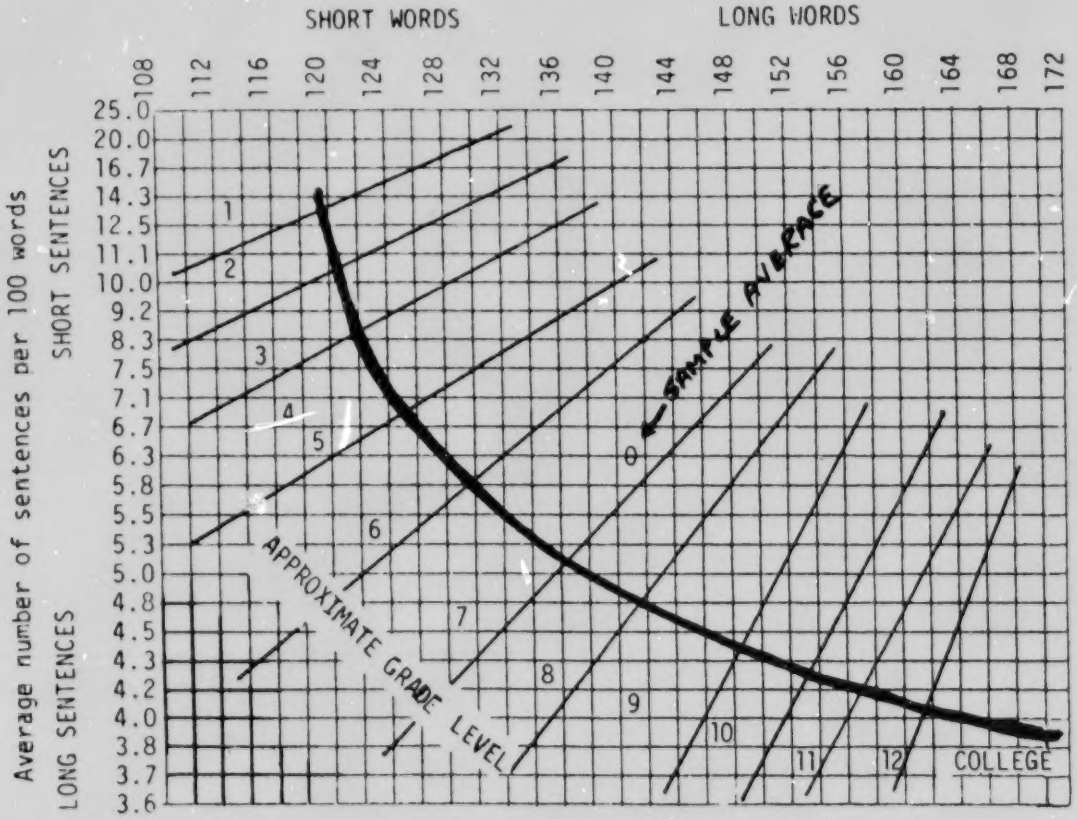


Figure 2 (Continued)

Directions: Use a stratified random procedure, at least five percent for books, more for shorter materials. For example: If a book is 350 pages long, five percent equals 17.5. 350 ÷ 17.5 equals 20. Select a starting number, for example: 6. The first sample page is 6; then 26; then 46; then 66; etc. If one of the pages has no text proceed one page at a time forward until a page is found from which a sample can be taken.

From each of these pages select 100 word passages (alternate positions on page from which taken. For example: beginning, middle, ending). Plot the average number of syllables and average number of sentences per 100 words on the above graph.

This will give you the average readability of the book.

Example:

	Syllables	Sentences
First 100 Words	124	6.6
Second 100 Words	141	5.5
Third 100 Words	158	6.3
Average	141	6.3

Then plot the syllables and sentences for each sample. This will illustrate the range of readability for the literature being analyzed.

(For further information and validity data, see April, 1968 Journal of Reading and March, 1969 Reading Teacher.)

Figure 3: FLESH READABILITY FORMULA PROCEDURE

There is one readability procedure that is easily used with the assistance of a simple calculator. The Rudolph Flesh (1949) Readability Formula involves a count of the syllables in the sample and words per sentence in conjunction with a mathematical formula. The result is a "Reading Ease Score" which translates into grade reading level.

I. 1. Count the words in the sample (100 words or more, if available).
   2. Count the number of sentences.
   3. Divide the total number of words by the total number of sentences.
   4. Multiply that total (average number of words in a sentence) by 1.015.

II. 1. Count the syllables in the sample.
   2. Multiply the number of syllables by 100.
   3. Divide that total by the number of words in the sample.
   4. Multiply that total by .846.

III. Add I and II.

IV. Subtract III from 206.835.
That is the reading ease score. It translates accordingly:

R.E.Score	Grade	R.E.Score	Grade
115-120	1	80- 89	6
110-114	2	70- 79	7
105-109	3	60- 69	8.5
100-104	4	50- 59	11
90- 99	5	30- 49	14.5
		0- 29	College Grad.

Flesh, Rudolph. The Art of Readable Writing. New York: Harper and Brothers, 1949.

Figure 4: Flesh Readability Procedure Form

Textbook_____ Publisher_____

Pg.#	#Wds. ÷ #Sent	x 1.015 = X	#Syl x 100 ÷ #Wds.	x .846 = Y

Figure 4 (Continued)

Minus (x + y)		R.E. Score
206.835		
206.835		
206.835		
206.835		
206.835		
206.835		
206.835		
206.835		
206.835		
206.835		
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206.835		
206.835		
206.835		

R.E. Score	Grade
115-120	1
110-114	2
105-109	3
100-104	4
90-99	5
80-89	6
70-79	7
60-69	8.5
50-59	11
30-49	14.5
0-29	College Grad.

The textbook sample in Figure 5 demonstrates the rules.

Instructions for Calculations

WORD COUNT - Fry: Count all words up to 100 words (may end in partial sentence.) Flesh: Count all words up to approximately 100 (end on full sentence).

Numbers - such as 30, 1951, 27-A, L78G are each counted as one word.

Hyphenated words - one word.

Abbreviations - one word.

Acronyms - such as PVA, NSU, USA, AVA are each counted as one word.

SENTENCES - Fry: Count the sentences and determine the tenth of a sentence when ending in a partial sentence. Flesh: Count all sentences.

Parenthetical expression - (enclosed in brackets) is one sentence even if contained in another sentence.

Semi-colon or colon - If there is a semi-colon or colon in what we usually consider a sentence, that is considered to be another sentence. The easiest way to handle that is to count one sentence overall and add one sentence - count for each colon or semi-colon in the sentence.

RECORDING - Fry: Write down the number of sentences per 100 words. In the example the 100th word is "smaller." There are 8 full sentences, plus the partial sentence ending in "smaller." There are 4 words up to and including "smaller" and 25 words in the sentence. Divide 4 by 25 (4 ÷ 25). That result is approximately .16 and rounds to 0.2. Therefore, for the Fry sentence count there are 8.2

FIGURE 5: SAMPLE WITH WORD COUNT OVER WORDS

```
 1    2      3            4
CAUSES OF INEFFICIENT STERILIZATION

       5   6    7         8      9    10   11    12
     WHEN THE A.T.I. INDICATOR DOES NOT CHANGE COLOR

13 14 15 16   17   18    19  20 21  22   23  24
IT IS A SURE SIGN THAT THERE IS A DEFECT IN THE

    25           26     27     28        29    30
STERILIZATION TECHNIQUE OR APPARATUS.  NEVER NEGLECT

 31    32
THIS WARNING.

       33   34      35          36     37    38
     CAUSES OF STERILIZATION FAILURE ARE NUMEROUS,

   39    40  41      42     43   44      45   46
ELUSIVE AND OFTEN DIFFICULT TO LOCATE.  THE DEFECT

 47    48     49       50       51  52    53  54  55
MAY REQUIRE MINUTE EXAMINATION OF EVERY PART OF THE

   56       57  58   59    60          61        62
AUTOCLAVE, THE LOAD AND PERSONNEL TECHNIQUES.  BELOW

 63   64    65  66  67  68    69     70   71  72
ARE LISTED SOME OF THE MOST COMMON POINTS TO LOOK

 73
FOR:

    74     75       76      77    78
     A.  FAULTY PREPARATION OF MATERIALS.

      79   80   81   82     83      84    85     86
     THE MANNER IN WHICH MATERIALS ARE PREPARED FOR

     87         88    89      90     91  92
STERILIZATION EXERTS GREAT INFLUENCE ON THE
```

FIGURE 5 (CONTINUED)

EFFICIENCY OF THE PROCESS. GENERALLY SPEAKING, THE
SMALLER THE PACK THE BETTER, AS A LARGER PACK
OBVIOUSLY WILL REQUIRE GREATER TIME FOR PENETRATION
OF STEAM HEAT TO ITS CENTER.

(PRINCIPLES AND PRACTICES OF AUTOCLAVE STERILIZATION. NORTH HOLLYWOOD, CALIFORNIA: ASEPTIC-THERMO INDICATOR COMPANY, (NO DATE), P. 12)

sentences per 100 words. Flesh: Count to the end of the sentence in which the 100th word occurs. Therefore, there are 121 words and nine sentences. Enter these figures on the form and complete the math involved.

SYLLABLES - Syllables are counted in the same way for each procedure. An easy way is to count only those syllables over 1 for each word. For example:

1 2 3 4 5 6 7 8
Caus/es of in/ef/fi/cient ster/il/i/za/tion

Complete the counting for the entire passage in the same manner. Your total then is added to the total number of words (100 for Fry; 121 for Flesh, in this example). That gives you the total syllable count.

RECORDING - Fry: Write down the total number of syllables. On the graph plot the total syllables (across) to the number of sentences per 100 words. That will give you the approximate readability level of that passage. Flesh: Write down the number of syllables in the space on the form and complete the mark as noted. The add x and y and subtract that figure from 206.835. That is the Reading Ease score and translates to grade level on the chart.

The total sample syllable count and results for Flesh and Fry methods follow in Figure 6.

FIGURE 6: SAMPLE TEXT
WITH SYLLABLES MARKED

CAUS/ES OF IN/EF/FI/CIENT STER/IL/I/ZA/TION

WHEN THE A./T./I. IN/DI/CA/TOR DOES NOT CHANGE COL/OR IT IS A SURE SIGN THAT THERE IS A DE/FECT IN THE STER/IL/I/ZA/TION TECH/NIQUE OR AP/PAR/A/TUS. NE/VER NEG/LECT THIS WARN/ING.

CAUS/ES OF STER/IL/I/ZA/TION FAIL/URE ARE NU/MER/OUS, E/LU/SIVE AND OF/TEN DIF/FI/CULT TO LO/CATE. THE DE/FECT MAY RE/QUIRE MIN/UTE EX/AM/IN/A/TION OF EV/ER/Y PART OF THE AU/TO/CLAVE, THE LOAD AND PER/SON/NEL TECH/NIQUES. BE/LOW ARE LIST/ED SOME OF THE MOST COM/MON POINTS TO LOOK FOR:

A. FAUL/TY PRE/PAR/A/TION OF MA/TER/I/ALS.

THE MAN/NER IN WHICH MA/TER/I/ALS ARE PRE/PARED FOR STER/IL/I/ZA/TION EX/ERTS GREAT IN/FLU/ENCE ON THE EF/FI/CIEN/CY OF THE PRO/CESS. GEN/ER/AL/LY SPEAK/ING, THE SMAL/LER THE PACK THE BET/TER AS A LAR/GER PACK OB/VI/OUS/LY WILL RE/QUIRE GREAT/ER TIME FOR PEN/E/TRA/TION OF STEAM HEAT TO ITS CEN/TER.

(IBID, P. 12)

The following results were obtained from readability analyses of the preceding sample.

Fry:

100 words

8.2 sentences

184 syllables

No record of this size on chart - Grade may not be inferred, select new sample

Flesh:

121 words

9 sentences

214 syllables

R.E. Score 43.57

14.5 grade

Exercise 1

Following are three examples selected from other sections of the same literature. Practice the procedure, marking syllables and sentence count directly on the samples.

Exercise 1 Sample 1

Sterilization Indicators

The above discussion has shown that to assure sterilization it is necessary that the materials be exposed to saturated steam at sufficient temperatures for certain minimum periods of time. Temperature recorders, pressure gauges, autoclave tape, etc., record conditions inside the autoclave surrounding the materials but do not give information as to conditions inside the packs.

Assurance of sterilization can be obtained through the use of a sterilization control placed in the central, least accessible portion of the materials, which will record the effects of the necessary elements for sterilization: time, temperature and saturated steam. The U.S. Pharmacopeia XVIII on page 831 states, "It

IS IMPORTANT TO CHECK THE HEAT DISTRIBUTION, PARTICULARLY IN NEW OR REMODELED AUTOCLAVES OR FOLLOWING CHANGES IN LOADING CONDITIONS, BY PLACING SUITABLE DEVICES TO REGISTER THE TEMPERATURES ATTAINED AT DIFFERENT HORIZONTAL AND VERTICAL PLANES IN THE STERILIZING CHAMBER. . . THESE DEVICES SHOULD BE CAPABLE NOT ONLY OF INDICATING THE ATTAINMENT OF AN EFFECTIVE STERILIZATION TEMPERATURE, BUT ALSO OF GIVING AN INDICATION OF THE DURATION OF THAT TEMPERATURE."

(IBID, P. 5)

Exercise 1 Sample 2

Another very dependable sterilization indicator is A.T.I.'s Sterilometer™.

This is a convenient, individual disposable tag, with a wide bar impregnated with a special white chemical formulation that is sensitive to standard autoclave sterilizing conditions. (For reaction time, see specifications below). The Sterilometer Sterilization Indicator bar changes color from white to black when sterilizing conditions have been met inside a surgical pack in a standard 250°F. autoclave. Chemical formulation of the Sterilometer Sterilization Indicator is sensitive to the factors necessary for sterilization -- the correct combination of time, temperature, and saturated steam. The Sterilometer does not begin to react until live steam has penetrated to it. The wide bar turns black

ONLY WHEN SUFFICIENT TIME HAS PASSED FOR COMPLETE STERILIZING CONDITIONS, PLUS AN ADEQUATE MARGIN OF SAFETY.

(IBID, P. 8)

Exercise 1 Sample 3

B. Improper Loading Of Autoclave.

Remember that steam flows from top to bottom. All layers of fabric material should be parallel and placed in the autoclave so that the layers are vertical rather than horizontal. Thus, steam will penetrate, flowing down between the layers of fabric rather than having to force its way through each layer. A Steam-Clox should be used in every large pack and in every drum, if drums are used.

All lids should be removed from jars, or partially removed, so that air will not be trapped. A good general rule is to place all utensils in the sterilizer in such a position that if they contained water, the water would all run out.

(Ibid, p. 13)

SAMPLES: HOW SELECTED AND HOW MANY

It is important, if an accurate picture of the literature is to be obtained, that the samples to be analyzed be selected at random. Too many subjective errors would be introduced by merely paging through the book, picking what appears to be representative samples. The easiest way and one that is sufficiently random is entitled a stratified random sampling.

In order to achieve the stratified random sample, it must first be decided how many samples are to be drawn. A useful rule is to select samples from 5% of the pages in the book. Remember, however, that the more samples drawn, the more accurate will be the analysis. That point is demonstrated in the following analyses (See Figure 7) of a medical assisting textbook under consideration in which 3, 6, 10, 15 were drawn. (Average was used in this case to distinguish between results of analyses in which increasing number of samples were drawn.)

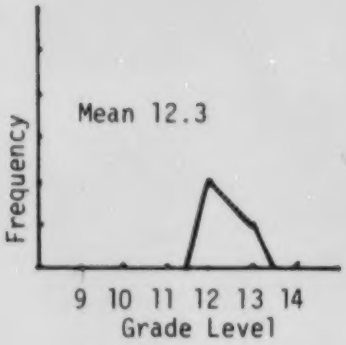
It is recommended that 5% sample or more be drawn for accuracy.

Procedure: Assume a book has 300 pages (not including glossary or index). A 5% sample requires (.05 x 300) 15 samples. To establish the starting page divide the total pages (300) by the total samples required (15). That result is 20. Randomly pick a number from 1-20. This can be done using numbers in a hat. That number is the starting page. Let's assume it is 6. The remainder of the pages are selected by adding 20 to 6, 20 to 26, 20 to 46, etc. until all the samples are drawn.

Figure 7: Sample Graphs of GRL Frequencies: 3, 6, 10, 15 Samples

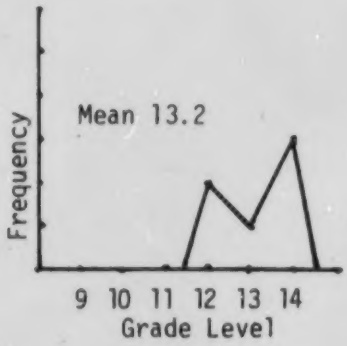
3 Samples

GRL	Freq.
12	2
13	1



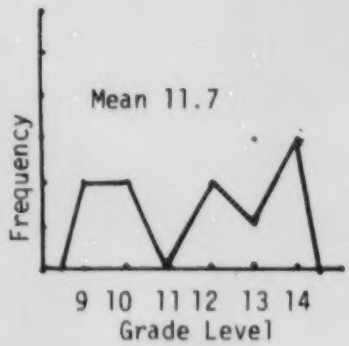
6 Samples

GRL	Freq.
12	2
13	1
14	3



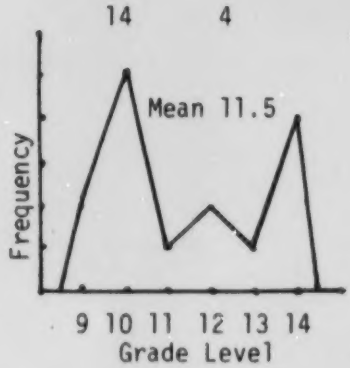
10 Samples

GRL	Freq.
9	2
10	2
12	2
13	1
14	3



15 Samples

GRL	Freq.
9	2
10	5
11	1
12	2
13	1
14	4



Now we know the pages of the book we will use in the analysis. If any of those pages contains no text (some may be pictures or diagrams) move one page at a time forward or backward until text is found. It is also recommended that the sample 100 words be selected alternatively from the beginning (B) and end (E) of the page. Therefore, page 6 would be 6-B (for beginning), page 26-E (for end), page 46-B, etc.

Exercise 2

Compute a stratified random sample schedule for the following:

1. Textbook with 350 pages.
2. Textbook with 1000 pages.
3. Textbook with 525 pages.

If the literature you plan to analyze contains less than 200 pages, but more than 25, select 10 samples. For literature of less than 25 pages, but more than 5, select every other page. For literature less than 5 pages, take a sample of every page.

On the following page (See Figure 8) is a form to assist you in recording your findings. It is always a good idea to keep a file of literature analyzed.

Figure 8: Readability Record

Author(s):

Title of Literature:

Publisher:

Publication Data:

Total Number of pages:

Percent of pages sampled:

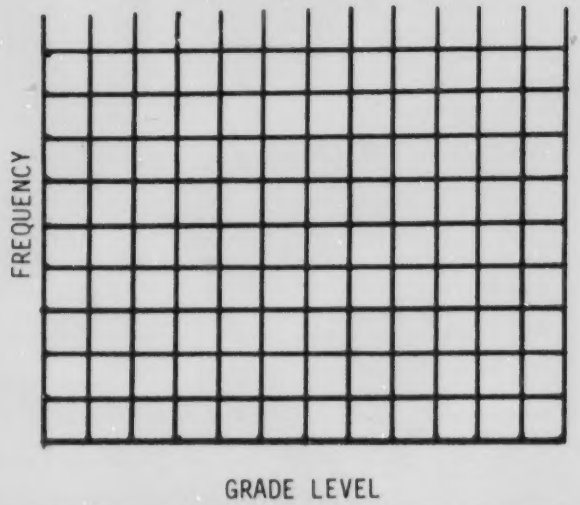
Procedure used:

Page numbers from which samples were taken:

Highest readability:

Lowest readability:

Graph for Plotting Results



SECTION 2
CLOZE PROCEDURE

STUDENT READING ABILITY

Diagnostic reading test scores are often available for students in vocational programs. These scores, normally on file at the home school (in the counselors office at the comprehensive high school), are useful indicators of a student's general reading ability. How well they relate to vocational reading requirements is subject to conjecture. There simply has not been a concerted effort to separate vocational reading skill from general literacy skill. Because of these unknowns it is strongly recommended that you not accept a GRL score as final. Standardized reading test scores are useful indicators, but they should be supplemented with teacher made vocational reading tests.

A useful and highly adaptable reading test is the cloze procedure.

> The cloze procedure is an objective measure of language correspondence between reader and writer. It consists of a cloze (word) unit, a single occurence of a successful attempt to reproduce accurately a part deleted from a message, by deciding from the context that remains what the missing part should be (Taylor, 1953).
>
> The cloze procedure differs from vocabulary contextual texts. Rather than choosing omitted words because of definition and purpose, the cloze units are chosen mechanically; every fifth word, for example, occurring at any point in a continuous passage is omitted. The cloze design incorporates control against misrepresenting strength/weakness in content vocabulary as an indication of the test subject's ability/inability to read (Thornton, 1979).

Any piece of literature can be clozed. That includes textbooks, occupational literature, safety messages, codes, medical contraindications, literally anything. The procedure is described below:

1. Select a piece of literature.
2. Leave the first sentence intact.
3. Delete every fifth word.
4. Leave the last sentence intact.
5. Instruct the student to read the entire passage first, then begin filling in the blanks.
6. Instruct the student to be aware when guessing is the rationale for word selection, but to guess when other rationale fails.

Scoring the test is accomplished as follows:

0-39.9% Frustrational level (Student will not be able to read the literature)

40.0-69.9% Instructional level (Student will require intervention to be able to read the literature)

70.0-100.0% Independent level (Student is able to read the literature without intervention)

On the following pages five different cloze tests have been prepared using on-the-job literature. The correct words which have been deleted are listed following each example.

FIGURE 9: ETHYLENE OXIDE STERILIZATION
CLOZE TEST

ARTICLES THAT CAN BE STERILIZED BY ETHYLENE OXIDE

STEAM UNDER PRESSURE, DRY HEAT, AND ETHYLENE OXIDE ARE THE ONLY STERILIZATION METHODS RECOMMENDED IN A RECENT REPORT ON DESIGN AND OPERATION OF CENTRAL SUPPLY SERVICES BY THE DIVISION OF HOSPITAL AND MEDICAL FACILITIES OF THE U.S. PUBLIC HEALTH SERVICE.[14]

REPORTS FROM A WIDE _____ OF HOSPITAL AND MEDICAL _____ INDICATE THAT ETHYLENE OXIDE _____ BE USED EXCLUSIVELY, ELIMINATING _____ STEAM (AUTOCLAVING) AND _____ HEAT STERILIZATION, PROVIDED THAT _____ TIME OR ENOUGH EQUIPMENT _____ AVAILABLE TO HANDLE THE _____ EXPOSURE AND AERATION PERIOD _____.

APPARENTLY ANY ITEM MAY _____ STERILIZED WITH ETHYLENE OXIDE _____ RECOMMENDED CONDITIONS, WITHOUT DAMAGE _____ THE MATERIAL OR OBJECT _____ IN THE ETHYLENE OXIDE _____ CHAMBER.

FIGURE 9 (CONTINUED)

THE PENETRATING GAS _____ FAR SUPERIOR TO THE _____ SOLUTIONS OF "COLD STERILIZATION," _____ METHOD NOT RECOMMENDED IN _____ USPHS LIST. FOR THIS _____, ETHYLENE OXIDE STERILIZATION APPEARS _____ BE THE OBVIOUS REPLACEMENT.

_____ NOWHERE IS IT RECOMMENDED _____ ETHYLENE OXIDE BE USED _____ A REPLACEMENT FOR STEAM _____ (OR DRY HEAT, WITHIN _____ LIMITED SPHERE OF USEFULNESS). _____, ETHYLENE OXIDE, WHEN COUPLED _____ THE EFFECTIVE, ECONOMICAL, AND _____ STEAM STERILIZATION, IS INCREASINGLY _____ AS PROVIDING "THE COMPLETE _____ SYSTEM FOR EVERY HOSPITAL."[15]

_____ OXIDE CAN BE USED _____ THE STERILIZATION OF PLASTICS (_____ SEE WARNING NOTES BELOW), _____, METALS, LEATHER, WOOD, WOOL, _____, NYLON, GLASS, AND VIRTUALLY _____ OTHER MATERIAL. WHILE THE LIST OF EQUIPMENT AND MATERIALS AMENABLE TO ETHYLENE OXIDE

FIGURE 9 (CONTINUED)

STERILIZATION IS ENDLESS, HERE ARE SOME OF THE INSTRUMENTS AND EQUIPMENT ITEMS FOR WHICH IT IS RECOMMENDED.

PRINCIPLES AND PRACTICE OF ETHYLENE OXIDE STERILIZATION. NORTH HOLLYWOOD, CALIFORNIA: ASEPTIC-THERMO INDICATOR COMPANY, (NO DATE), P. 12.

FIGURE 9 (CONTINUED)

RANGE	PLACED	ITS
SOURCES	STERILIZATION	INSTEAD
COULD	IS	WITH
BOTH	ANTISEPTIC	SAFE
DRY	A	HAILED
AMPLE	THE	STERILIZATION
WERE	REASON	ETHYLENE
LONGER	TO	FOR
NEEDED	BUT	BUT
BE	THAT	RUBBER
UNDER	AS	RAYON
TO	STERILIZATION	ANY

PRINCIPLES AND PRACTICE OF ETHYLENE OXIDE STERILIZATION. NORTH HOLLYWOOD, CALIFORNIA: ASEPTIC-THERMO INDICATOR COMPANY, (NO DATE), P. 12.

FIGURE 10: CHAIR OPERATION MANUAL CLOZE TEST

OPERATION

3.1 GENERAL

THIS SECTION INCLUDES SIMPLE AND EASY TO FOLLOW INSTRUCTIONS AND PROVIDES A THEORY OF OPERATION FOR THE MAXI CHAIR MC80. OPERATOR MUST _____ THOROUGHLY FAMILIAR WITH THIS _____ BEFORE ATTEMPTING OPERATION.

3.2 _____ OF OPERATION

THE MAXI _____ PROVIDES A LARGE VARIATION _____ POSITIONS BY MEANS OF _____ ELECTRICALLY ACTIVATED MOTOR-DRIVEN FUNCTIONS: _____, TILT, AND HEADREST. AN "_____ RETURN" FEATURE IS STANDARD _____ WILL RETURN CHAIR TO _____ EXIT POSITION. REFER TO _____ SCHEMATIC, FIGURE 3-1 AND _____ DIAGRAM, FIGURE 3-2.

3.3 _____

CHAIR LIFT IS ACTIVATED _____ SWITCHES S1 OR S2 (_____ CONTROL), WHICH DIRECT _____ TO THE LIFT MOTOR (_____). THE MOTOR/GEAR

FIGURE 10 (CONTINUED)

BOX, M1, _____ OR RETRACTS THE SPRING-ASSISTED _____ MECHANISM TO CAUSE UP _____ DOWN MOVEMENT OF THE _____.

3.4 TILT

CHAIR TILT _____ ACTIVATED BY SWITCHES S3 _____ S4, WHICH DIRECT POWER _____ THE TILT MOTOR (M2). _____ MOTOR/GEAR BOX, M2, EXTENDS _____ RETRACTS THE TILT MECHANISM _____ CAUSE FORWARD OR BACKWARD _____ OF THE CHAIR.

3.5 _____

THE HEADREST IS CONTROLLED _____ THE ACTIVATION OF SWITCHES _____ OR S6, WHICH DIRECT _____ TO HEADREST MOTOR (M3). THE MOTOR WILL THEN EXTEND OR RETRACT THE HEADREST TO THE EXTENT DESIRED OR TO THE LIMIT SWITCH SETTINGS.

OPERATION AND SERVICE MANUAL, MAXI CHAIR. NEWPORT BEACH, CALIFORNIA: SMR, 1979, P. 3-1.

FIGURE 10 (CONTINUED)

BE	CABLING	OR
SECTION	LIFT	TO
THEORY	BY	THE
CHAIR	DUAL	OR
OF	POWER	TO
THREE	M1	MOVEMENT
LIFT	EXTENDS	HEADREST
AUTO	LIFT	BY
AND	OR	S5
THE	CHAIR	POWER
THE	IS	

OPERATION AND SERVICE MANUAL, MAXI CHAIR. NEWPORT BEACH, CALIFORNIA: SMR, 1979, P. 3-1.

FIGURE 11: TREATMENT CABINET OPERATION
CLOZE TEST

OPERATION

3-1. AIR PRESSURE PANEL

NOTE

ELECTRICAL PANEL NEED NOT BE TURNED ON WHEN A CENTRAL CLOSED TYPE AIR PRESSURE SYSTEM IS USED. DISREGARD _____ 3-1A THROUGH 3-1C.

A. _____ ON MAIN POWER SWITCH.

_____. CHECK POWER INDICATOR LAMP _____ SEE THAT POWER IS _____.

C. PUSH VAC-PRES SWITCH _____ PRES OR DEPRESS PLUS (_____) SIDE OF FOOTSWITCH.

D. _____ AIR REGULATOR CONTROL CLOCKWISE _____ INCREASE AIR PRESSURE, COUNTER-CLOCKWISE _____ DECREASE AIR PRESSURE. SET _____ DESIRED AIR PRESSURE.

NOTE

_____ CABINET - CONTAINED PUMPS, SMR _____ REGULATOR BE TURNED TO _____ CLOCKWISE POSITION.

FIGURE 11 (CONTINUED)

NOTE

AIR _____ GAUGE WILL NOT INDICATE _____ OF AIR PRESSURE UNLESS _____ SYSTEM IS UNDER LOAD. _____ LOAD AIR PRESSURE SYSTEM, _____ AIR PASSAGE THROUGH THE _____ LOCATED AT THE END _____ THE AIR HOSE.

CAUTION

_____ NOT BLOCK FLOW MORE _____ NECESSARY TO READ PRESSURE. _____ CAN OVERHEAT.

NOTE

CABINETS _____ DEVILBISS PUMP; MAXIMUM PRESSURE _____ 30 PSIG; WITH METAL _____ PUMP, 25 PSIG.

E. _____ VAC-PRES SWITCH TO CENTER (_____) POSITION.

F. NASOPHARYNGOSCOPE (J6 _____ ONLY).

1. PLUG NASOPHARYNGOSCOPE _____ NASOPHARYNGOSCOPE RECEPTACLE.

FIGURE 11 (CONTINUED)

2. TURN NASOPHARYNGOSCOPE CONTROL KNOB CLOCKWISE TO INCREASE INTENSITY; COUNTERCLOCKWISE TO DECREASE INTENSITY.

OPERATING AND SERVICE MANUAL FOR TREATMENT CABINETS. NEWPORT BEACH, CALIFORNIA: SMR (NO DATE), P. 3-2.

FIGURE 11 (CONTINUED)

STEPS	WITH	DO
TURN	SUGGESTS	THAN
B	EXTREME	PUMPS
TO	PRESSURE	WITH
ON	AMOUNT	IS
TOWARD	THE	BELLOWS
+	TO	PUSH
TURN	BLOCK	OFF
TO	CUT-OFF	CABINET
TO	OF	INTO
TO		

OPERATING AND SERVICE MANUAL FOR TREATMENT CABINETS. NEWPORT BEACH, CALIFORNIA: SMR (NO DATE), P. 3-2.

FIGURE 12: GRIEVANCE PROCEDURE
CLOZE TEST

GRIEVANCE PROCEDURE

SECTION 1.

A GRIEVANCE SHALL BE DEFINED AS A DISPUTE OR COMPLAINT ARISING BETWEEN THE PARTIES HERETO UNDER OR OUT OF THIS AGREEMENT OR THE INTERPRETATION, APPLICATION, PERFORMANCE, TERMINATION, OR ANY ALLEGED BREACH THEREOF, AND SHALL BE PROCESSED AND DISPOSED OF IN THE FOLLOWING MANNER:

STEP 1. AN EMPLOYEE _____ A GRIEVANCE AND/OR _____ UNION DELEGATE OR OTHER _____ SHALL TAKE IT UP _____ MEET WITH HIS DEPARTMENT _____ WITHIN TEN (10) WORKING _____ AFTER IT AROSE OR _____ HAVE BEEN KNOWN TO _____ EMPLOYEE. THE EMPLOYER SHALL _____ ITS ANSWER TO THE _____ AND/OR HIS UNION _____ OR OTHER REPRESENTATIVE WITHIN _____

FIGURE 12 (CONTINUED)

(5) WORKING DAYS AFTER _____ PRESENTATION OF THE GRIEVANCE _____ STEP 1.

STEP 2. _____ THE GRIEVANCE IS NOT _____ IN STEP 1, THE _____ MAY, WITHIN FIVE (5) _____ DAYS AFTER THE ANSWER _____ STEP 1, BE PRESENTED _____ STEP 2. WHEN GRIEVANCES _____ PRESENTED IN STEP 2, _____ SHALL BE REDUCED TO _____, SIGNED BY THE GRIEVANT _____ HIS UNION REPRESENTATIVE, AND _____ TO THE HOSPITAL'S PERSONNEL _____ FOR A HEARING ON _____ GRIEVANCE. A GRIEVANCE SO _____ IN STEP 2 SHALL _____ ANSWERED BY THE EMPLOYER _____ WRITING WITHIN FIVE (5) _____ DAYS AFTER ITS PRESENTATION _____ THE HEARING.

FIGURE 12 (CONTINUED)

STEP 3. _____ THE GRIEVANCE IS NOT _____ IN STEP 2, THE _____ MAY, WITHIN FIVE (5) _____ DAYS AFTER THE ANSWER _____ STEP 2, BE PRESENTED _____ STEP 3. A GRIEVANCE SHALL BE PRESENTED IN THIS STEP TO THE ADMINISTRATOR OF THE INSTITUTION, OR HIS DESIGNEE; AND HE OR HIS DESIGNEE SHALL RENDER A DECISION IN WRITING WITHIN FIVE (5) WORKING DAYS AFTER THE PRESENTATION OF THE GRIEVANCE IN THIS STEP.

COLLECTIVE BARGAINING AGREEMENT. PHILADELPHIA: PHILADELPHIA COLLEGE OF OSTEOPATHIC MEDICINE, NATIONAL UNION OF HOSPITAL AND HEALTH CARE EMPLOYEES, DIVISION OF RWDSU, AFL-CIO, JULY 1, 1979 THROUGH JUNE 30, 1981, PP. 27-28.

FIGURE 12 (CONTINUED)

HAVING	IN	THE
HIS	IF	PRESENTED
REPRESENTATIVE	SETTLED	BE
AND	GRIEVANCE	IN
HEAD	WORKING	WORKING
DAYS	IN	AT
SHOULD	IN	IF
THE	ARE	SETTLED
GIVE	THEY	GRIEVANCE
EMPLOYEE	WRITING	WORKING
DELEGATE	AND	IN
FIVE	PRESENTED	IN
THE	DIRECTOR	

FIGURE 13: INJECTIONS CLOZE TEST

GIVING INJECTIONS IS A SERIOUS AND IMPORTANT PART OF MEDICAL TREATMENT. IN A VERY REAL _____ THE SAME KIND OF _____ AND CAUTION EMPLOYED IN _____ OPERATING PROCEDURE MUST BE _____ IN GIVING INJECTIONS. TWO _____ OBJECTS ARE BEING INTRODUCED _____ THE BODY, A HYPODERMIC _____ AND THE MEDICATION, AND _____ SHOULD BE DONE WITH _____ MUCH PRECISION AS A _____ EMPLOYS WHEN USING A _____. THE ACCURACY OF THE _____ OF INJECTION SIT AND _____ EXCELLENCE OF THE TECHNIQUE _____ INJECTION HELP CONTROL THE _____ OF THE MEDICATION. A _____ INJECTION OR IMPROPER TECHNIQUE _____ ADMINISTERING THE INJECTION MAY _____ MEDICATION FROM ACTING MOST _____ OR, MORE IMPORTANT, MAY _____ IRREPARABLE DAMAGE. A PHYSICIAN _____ AN INJECTION FOR A _____ ONLY WHEN IT IS _____ NECESSARY OR THE MANNER _____ TREATMENT MOST SUITED TO

FIGURE 13 (CONTINUED)

_____ EXISTING CIRCUMSTANCES. SOME OF _____ REASONS AND ADVANTAGES FOR _____ INJECTIONS OF MEDICATION (ALSO _____ TO AS PARENTERAL THERAPY) _____:

1. TO ADMINISTER MEDICATION _____ THE MENTAL OR PHYSICAL _____ OF THE PATIENT MAY _____ ANY OTHER ROUTE DIFFICULT _____ IMPOSSIBLE.
2. TO ACHIEVE _____ QUICK RESPONSE TO THE _____.
3. TO GUARANTEE THE _____ OF THE AMOUNT OF _____ RECEIVED.
4. TO OBTAIN _____ SURE RESPONSE FROM THE _____.
5. TO PREVENT IRRITATION _____ THE DIGESTIVE SYSTEM, LOSS _____ MEDICATION THROUGH INVOLUNTARY EJECTION _____ DESTRUCTION BY DIGESTIVE ACIDS.
6. TO ANESTHETIZE A SPECIFIC _____ OF THE BODY.

FIGURE 13 (CONTINUED)

7. _____ CONCENTRATE MEDICATION AT A _____ LOCATION IN THE _____.

INTRAMUSCULAR INJECTIONS _____ GIVEN WHEN A QUICK _____ PROLONGED ACTION IS PREFERRED _____ AN IMMEDIATE EFFECT OF SHORT DURATION. BY INJECTING MEDICATION INTO THE MUSCLE A DEPOSIT OF MEDICINE IS FORMED WHICH IS GRADUALLY ABSORBED INTO THE BLOOD STREAM. WHEN GIVEN PROPERLY, THE INTRAMUSCULAR INJECTION IS PROBABLY THE EASIEST, SAFEST, AND BEST TOLERATED OF THE SEVERAL TYPES OF INJECTIONS.

INTRAMUSCULAR INJECTIONS, WYETH LABORATORIES, PHILADELPHIA, PA. 19101, MAY 1969.

FIGURE 13 (CONTINUED)

SENSE	IN	OR
PREPARATION	PREVENT	A
AN	EFFICIENTLY	MEDICATION
EXERCISED	CAUSE	ACCURACY
FOREIGN	ORDERS	MEDICATION
INTO	PATIENT	A
NEEDLE	ABSOLUTELY	PATIENT
THIS	OF	OF
AS	THE	OF
SURGEON	THE	OR
SCALPEL	GIVING	AREA
CHOICE	REFERRED	TO
THE	ARE	SPECIFIC
OF	WHEN	BODY
EFFECTIVENESS	STATE	ARE
MISDIRECTED	MAKE	BUT
		TO

INTRAMUSCULAR INJECTIONS, WYETH LABORATORIES, PHILADELPHIA, PA. 19101, MAY 1969.

Exercise 3

Cloze the following passage and write out the instructions to the student regarding how they should proceed.

GETTING STARTED

Physical Examination - Every prospective employee is required to have a free complete medical examination to determine whether he or she is physically fit for the job. This examination is an important precautionary measure that protects you, your co-worker and patients in our hospital. An annual physical will also be scheduled near your anniversary date of employment.

Orientation - Prior to your starting date, a representative of the Personnel Department will meet with you to provide some of the basic information you will need to get started. At that meeting, you will receive information about your benefits, employee parking facilities, identification badge, and a copy of this handbook containing the work rules and regulations. (Employee Handbook. Philadelphia: Philadelphia College of Osteopathic Medicine. (No Date), p. 8)

Exercise 3: Answer Sheet

Instructions:

Words List:

The cloze procedure can also be used a teaching technique. A variety of cloze modifications are useful for vocational teachers.

The changes in the procedure reflect the purpose of the exercise. If, for example, an occupational instructor wishes to highlight functions of the skeletal system and be certain that the student reading the literature understands what is being read, the passage can be "clozed," deleting those words which are critical to the comprehension. The following skeletal system passage with "instructional modification" words (to be deleted) underlined illustrates the technique:

SAMPLE: INSTRUCTIONAL MODIFICATION CLOZE

The skeletal system comprises the bony framework of the body. It is composed of 206 bones in the adult and performs three main functions: support, protection, and movement. Bones give shape to the body as well as provide it with support. Many provide protection for the soft and delicate organs of the body: for example, the cranium protects the brain, the ribs protect the heart and lungs. Bones provide a place for the attachment of muscles, playing a part in the movement of the body by serving as passively operated levers.

> An additional function of bones is providing a storehouse of minerals that the body could draw from in case of inadequate nutrition. The long bones of the body are the site of blood cell formation. (Ferris and Skelly, 1979, p. 14)

Another modified cloze teaching technique is the "lexical cloze." Lexical is defined as relating to words of a language. The lexical cloze involves deletion of words according to the kinds of words they are, such as nouns, verbs, adjectives, etc. A later segment of this article develops case grammar modifications utilizing the lexical cloze, establishing applicability for occupational education reading intervention. The example which follows illustrates use of verb deletions in a female reproductive application. The words to be deleted have been underlined:

FEMALE REPRODUCTIVE SYSTEM

> The ovaries produce the female gametes, or ova. Ovaries contain thousands of microscopic sacs called graafian follicles in varying stages of development. Inside each follicle, an ovum develops. Usually only one follicle matures every twenty-eight days throughout the reproductive period of a woman, but occasionally two or more follicles may mature thus liberating more than one egg. (Gamete production ceases with menopause). As the follicle enlarges, it migrates to the outside surface of the ovary, breaks open, and the ovum is released from the ovary. This process is called ovulation and occurs about two weeks before the menstrual period begins; however, this time may vary somewhat with different individuals. (Ibid, p. 110)

Note that only the verb's involving an action on the part of the student have been marked for deletion. It is the activity that is emphasized in this reading intervention exercise.

When used as teaching technique, the cloze procedure is easily adapted to provide for increasing degree of difficulty. Often vocational students have experienced a history of failures in reading. The pattern is conducive to diminished motivation in an attempt to read. In order to break the pattern and increase the likelihood of a motivated reader, a pattern of reading successes is useful. Literature of any level of readability can be clozed. Thus, vocational literature at a low readability level can be used for those students who need a success stimulus. In addition, for teaching purposes, synonymous or words close to the correct word can be accepted. The number of clozed words can be decreased instead of following a schedule. The next example illustrates this point:

BODY MECHANICS FOR THE ASSISTANT

> Much of your work will require physical effort. Moving patients, carrying equipment, and pushing wheelchairs require muscle power. You will be less tired and less likely to strain yourself if you know how to use your body properly. Good body mechanics starts with proper posture. Correct posture is important in all positions, not only when you are standing. Correct posture makes lifting, pulling, and pushing easier. (Caldwell and Hegner, 1973, p. 38)

For the word "moving," the student would be correct inserting "assisting," for example. Note that only five deletions have been made and all are heavily clued.

CASE GRAMMAR AND THE CLOZE PROCEDURE

Gibson and Levin (1979) describe Fillmore's theory of case grammar. ". . . which imaginatively combines syntactic and semantic features." The study of meanings (semantics) and the orderly system of words (syntax) combine in Fillmore's Case Concepts (Brown, 1973). The theory of case grammar is easily adapted to teaching techniques using the cloze procedure. The following illustrations from The Nurse Assistant (1978) demonstrate the usage:

Agentive (A) - "The typically animate, perceived instigator of action."

The patient may fear the pain and physical discomfort that follow surgery (p. 8).

Instrumental (I) - "The inanimate force or object causally involved in the state or action named by the verb."

All the work you do will be directed toward one goal, the recovery of the patient (p. 13).

Dative (D) - "The animate being affected by the state or action named by the verb."

Always restrain yourself from loud emotional outbursts disturbing to patients or other workers (p. 25).

Factive (F) - "The object or being resulting from the state or action named by the verb."

Contaminated gowns and masks result from exposure to communicable diseases.

Locative (L) - "The location or spatial orientation of the state or action named by the verb."

Bedpans that are not sterilized after each use are left in the unit (p. 52).

Objective (O) - "The semantically most neutral case: anything representable by a noun whose role in the state or action named by the verb depends on the meaning of the verb itself."

Tray tables come in different designs (p. 88).

Benefactive (B) - "A noun deriving benefit of the action of the verb."

If oxygen is not piped in, an oxygen therapy technician will be responsible for setting up and maintaining oxygen cylinders and apparatus (p. 91).

Comitative (C) - "In accompaniment."

The most expensive and most important item of equipment in the unit is the bed (p. 118).

Temporal (T) - "When the verb is accomplished or occurs."

Do not leave the patient alone during this procedure, since it is not uncommon for a patient to become weak during the treatment (p. 194).

Modified cloze techniques can be used as introductory exercises, included in self-instruction packets, adapted for games, or structured for remedial work. They provide an excellent method of coordinating in-class vocational work and English or remedial reading treatment. (Reference Note 3)

Exercise 4

Underline each word in the following passage which could be clozed by Fillmore rules, entering above the word the letter which indicates the rule used.

THE PHYSICAL EXAMINATION

DORSAL RECUMBENT POSITION

The patient is flat on his back. Knees are bent (flexed) and slightly separated with feet flat on the bed. Loosen the gown at the neck. Cover the patient with a sheet. Place a small pillow under the head. This is the basic examination position.

HORIZONTAL RECUMBENT POSITION

The patient is flat on his back; his legs are slightly separated. A pillow is placed under his head.

KNEE-CHEST POSITION

The patient is placed on his abdomen. Head is turned to one side on a small pillow. Arms are bent and rest on either side of head. Knees are flexed and drawn up to meet chest. This is a difficult position to maintain. The patient must never be left along. Draping may be done with either one or two sheets.

This position is used to examine the anal and vaginal area.

PRONE POSITION

The patient is placed on his abdomen. Head is turned to one side on a small pillow. Arms are at sides or positioned on either side of head. One sheet is used for draping.

SIM'S POSITION

The patient is positioned on his left side. Head is turned to one side on a small pillow. Left arm is placed behind the body. Right arm is comfortably positioned in front. The left leg is slightly bent while the right leg is sharply flexed on abdomen. One drape is usually adequate. Sim's position is used for vaginal and rectal examinations and for giving enemas. (Caldwell and Hegner, 1973, pp. 142-144)

SECTIONS 3 - 6

READING VOCATIONAL TEXTS

READING VOCATIONAL TEXTS

The following four sections each present a set of important content reading skills. Only those skills particularly relevant to vocational texts have been included. Moreover, each skill has been broken down into segments requiring no more than 5-10 minutes of class time every other day. All homework utilizes the text assignments you would normally require at that point in your course. Because students must pay careful attention to their text in order to complete the reading skill assignment, they should more thoroughly understand the content material than they ordinarily would.

Each section presents the given skill using a variety of vocational examples. Opportunities are then provided for you to apply the skills so that you can be assured of mastering each one.

Following the individual skill discussions is a section called "Textbook Application." It is here that you apply each skill to your own course textbook. This second application accomplishes three purposes: 1) It allows you to locate examples and sample exercises that you can use in your classroom, thereby greatly reducing extra preparation time reading instruction might entail; 2) It enables you to tailor the skills to your text; and 3) It gives you an additional practice opportunity, this time using the same materials your students will use.

At the end of each section are additional suggestions for teaching the new skills.

SECTION 3-6 TIME FRAME

SECTION		TIMING
3	Basic Vocabulary Skills	Weeks 1 and 2
	Formal definitions	
	Synonyms	
	Illustrations	
	Glossaries	
	Textbook application	
	Teaching students basic vocabulary skills	
4	Paragraph Comprehension	Weeks 3, 4 and 5
	Paragraph subject	
	Paragraph main idea	
	Textbook application	
	Teaching students paragraph comprehension	
5	SQ4R	Weeks 6, 7, and 8
	The SQ4R method of study	
	Textbook application	
	Teaching SQ4R	
6	Recognizing and Recording Complex Information	Weeks 9, 10 and 11
	Classification	
	Comparison	
	Cause and effect	
	Textbook application	
	Teaching students to recognize and record complex information	

SECTION 3
BASIC VOCABULARY SKILLS

Section 3

Vocabulary Skills

Central to the medical assistance field is its specialized technical vocabulary. Complete and rapid comprehension of this vocabulary is imperative for the student. Because it is essential for students to understand the technical terms in their field, most authors have taken care to provide definitions and other comprehension aids. The simplist of these is the use of italics or boldfaced type to highlight important terms. Four other aids are discussed below: formal definitions, synonyms, illustrations, and glossaries. In addition, suggestions are made for teaching students how to make educated guesses when one of the other comprehension aids is not provided.

Formal Definitions

Often, an author will define an important technical term in the sentence that introduces it.

> A synthetic lamb's wool pad, often referred to as decubitus pads, may be placed under the patient's hips from the waist to the knees to reduce the pressure. (Wood & Rambo, 1977, 109)

term	definition
Decubitus Pad	Synthetic Lamb's Wool Pad

Clue words warn the reader that a definition is included in the sentence. These include "is," "means," "is referred to,"

"is called," and "is defined as." Locate the technical term and its definition in the following examples (remember that a technical term may include one word or several).

Exercise 5

The terms "sterile," "sterilize," and "sterilization," in a bacteriological sense, have only one scientifically correct meaning--the absense of destruction of all micro-organisms." (Aseptic - Thermo Indicator Co., 2)

term _____ definition _____

Ethylene oxide vaporizes (changes from its liquid form to a gas) at 51°F. (ibid, 5)

term _____ definition _____

This release of the ovum is called ovulation. (Thompson & Rosdahl, 1973, 146)

term _____ definition _____

Sickle cells (Fig. 6-13) are sickle-shaped red blood cells for which sickle-cell anemia is named. The red cells in this disease collapse and form the typical sickle shape whenever the oxygen content of the blood is reduced. (Woosley & Cuviello, 1977, 38)

term _____ definition _____

Synonyms

As an alternative to a formal definition, an author may clarify a technical term by the use of a synonym. The synonym may be enclosed in commas or parentheses directly following the term or the word "or."

> Most living organisms need an oxygen supply to live, but there are some organisms that do not; they are called anaerobic (without oxygen). (Wood and Rambo, 1977, 39)

term	definition
anaerobic	without oxygen

Exercise 6

> (Carcinoma) or cancer may occur in any part of the digestive tract. Surgery, radiation, or chemotherapy are prescribed. (Ferris & Skelley, 1979, 91).

term	definition

> Even if a formalized nursing history is not used, information relative to allergies, medications currently being taken, and the patients perception of his or her entering problem (often called the chief complaint) is gathered. (Ellis, Nowis, & Bentz, 1977, 86)

term	synonym

> One of the most obvious signs of a respiratory problem is difficulty in breathing, or dyspnea, which may be categorized into several classifications. (Thompson & Rosdahl, 1973, 298).

term	synonym

Illustrations

One of the most frequent types of definition in nursing literature is an illustration. Unfortunately, students often skip over the illustrations when they are reading. The first task of an instructor is to impress on students the need to immediately study the designated figure whenever it is mentioned in the prose (Ex: "See Fig. 8-2"). In the following example, those terms explained by an illustration are noted along with the page number of the prose and the diagram. Forcing students to physically note this information, although unimportant in itself, is a useful first step in teaching them to use diagrams as comprehension aids. Later they will apply the visual definition to the prose automatically.

> Some red blood cells are said to contain basophilic stippling (Fig. 6-9). Basophilic stipple cells are caused by the action of toxins on regenerating red blood cells, resulting in the formation of chromatin dots in the cell cytoplasm. The dots take the basic blue stain and appear as blue dots in the red hemoglobin. (Woosley & Curvielle, 1977, 38)

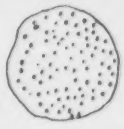


Fig. 8-9. Basophilic stipple cell.

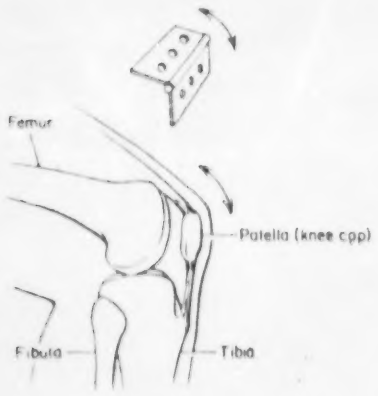
Pg. # terms	Pg. # Ill.	Terms
38	38	basophilic stipple cell

Exercise 7

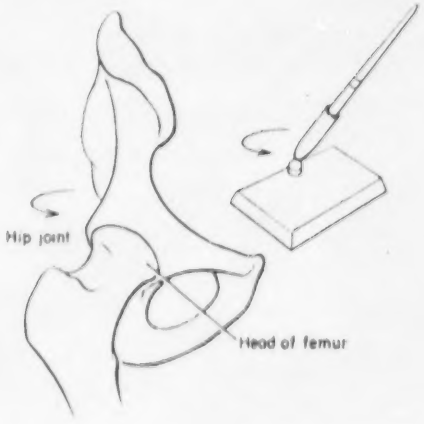
List terms found in text and illustration.

Kinds of Joints. There are primarily 3 different kinds of joints. The first is the type in which there is no motion at all, as in the bones of the skull which are fitted together with interlocking notches. These are referred to as immovable or fibrous joints. Within the second kind, known as slightly movable or cartilaginous joints, there is a slight degree of motion or flexibility, as is found in the vertebral column. The third type of joint is classified as "freely movables" or synovial or diarthrodial joints and can be found in many parts of the body, such as the shoulder.

There are several kinds of freely movable joints. Your finger and knee joints move like a door on its hinges and are appropriately called hinge joints. In the shoulders and the hips, ball-and-socket joints allow rotating motions--the rounded end of one bone (the ball) fits into the hollowed-out end of the other (the socket). The elbow is an example of a pivot joint, which makes it possible to turn the forearm as in turning a doorknob (see Fig. 13-4). The wrist is an example of a gliding joint. (Thompson & Rosdahl, 1973, 92-93).



HINGE JOINT



BALL-AND-SOCKET JOINT

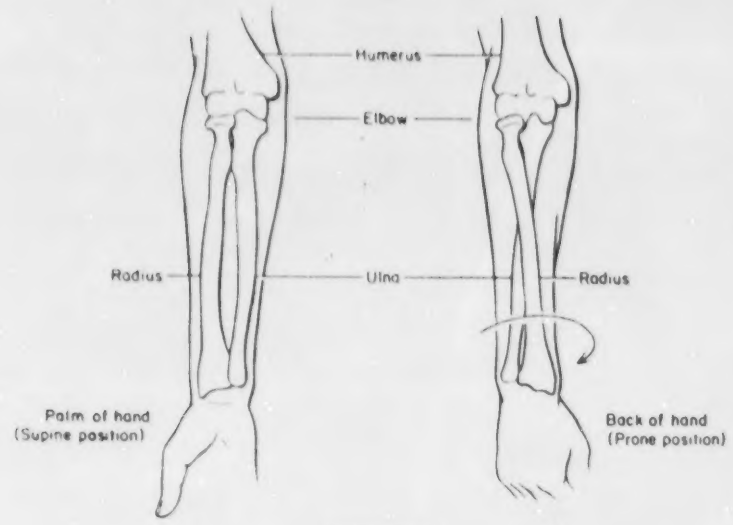


Figure 13-4. Some freely movable joints.

Pg. # term	Pg. # Ill.	Terms
92	93	

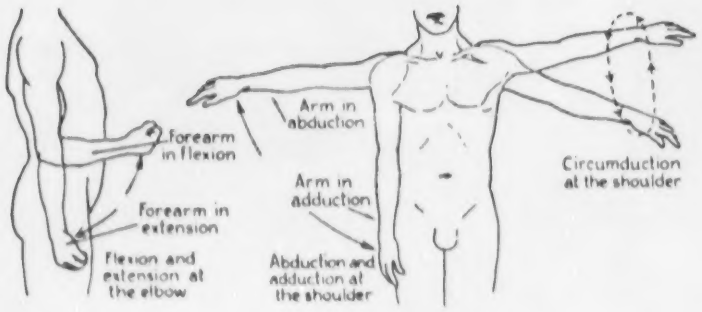

Arm in abduction
Forearm in flexion
Arm in adduction
Circumduction at the shoulder
Forearm in extension
Flexion and extension at the elbow
Abduction and adduction at the shoulder

Figure 13-5. Movement types. (Baillif and Kimmel: Structure and Function of the Human Body. Philadelphia, Lippincott)

Movements

> Some of the many different motions that the body can perform have definite names so far as function is concerned. Flexion decreases the angle between 2 bones or bends a part on itself, as in bending the elbow; extension, or straightening, is the opposite. Abduction is movement away from the midplane of the body; adduction, the opposite, is movement toward the midplane. If you hold your arm out straight and then move it around in a circle, all these movements are combined; the resulting motion is circumduction. A different kind of motion is rotation, which is twisting one part with respect to that which joins it, but without changing the angle between the two. An example of rotation is twisting the head in the familiar gesture of saying "No." (Thompson & Rosdahl, 1973, 94).

Pg. # terms	Pg. # Ill.	Terms
94	94	

Glossaries

Many current nursing assistance texts include glossaries at the end of the chapter or book. The teacher's task is to make sure the students use this aid. In the initial weeks of a course students can be required to read the glossary the night before beginning a new chapter. Initially, as they read the chapter and encounter a new word defined in the glossary they can note it on a separate piece of paper. While the notation is not important in itself, the requirement of writing it will force them to actively use the glossary. This requirement and the assigned previewing can be relaxed later in the term.

Educated Guessing

Sometimes an author makes the meaning of word clear, but doesn't actually define it. More frequently, a term is defined once early in the book, but will be used later without definition. Students may not remember the initial definition. Encourage them to skip a word they don't know, read the surrounding sentences and then make an educated guess as to its meaning. Students reading the following exerpt might not understand the word "caustic". However, an educated guess could be made with the aid of the underlined phrases--caustic chemicals are dangerous and harmful.

> All chemicals in use should be labeled and instructions for their use should be carefully read and understood before handling. Chemicals can be very caustic and result in damage to the tissues. They would NOT be used on an open wound. (Atkinson, 1976, 67).

Exercise 8

It is most effective to teach the skill of educated guessing in class discussions where students can locate clues and discuss their implications.

The following two exercises provide you the opportunity to located clues that students could use to guess at the meaning of the circled word.

> The preventive treatment for bedsores is most important. Bedsores are caused by pressure on the parts of the body that are not covered by pads of fat or other tissues thereby causing a break in the skin and destruction of the tissues beneath it. The skin is more likely to break down if the

area is continually moist or is not clean. In addition, rest in bed affects the circulation and increases the pressure on the bony prominences of the body, such as the spine, the shoulder blades, and the elbows. The dangers are increased if a patient must lie in one position or if he has a cast or splints or a disease condition that affects the circulation. As soon as a break in the skin occurs, the way is open to infection. (Thompson & Rosdahl, 1973, 264)

Clues that could help students guess at the meaning:

Early Ambulation. It is common practice to get the patient out of bed hours after surgery, instead of keeping him in bed for prolonged periods, which adds to his discomfort and delays his recovery . . . You should remain with the patient the first few times that he is out of bed. Assist him to dangle his feet at the side of the bed for a few minutes so that his circulatory system can adjust to his change of position. When he no longer feels dizzy or light-headed, assist him to stand, take a few steps, and sit in a chair. In the postoperative orders, the patient's doctor will specify when the patient is to be ambulated, how often, for how long a period of time, and with what, if any, limitation. (Wood & Rambo, 1977, 493)

Clues that could help students guess at the meaning:

Exercise 9

Textbook Application

Select an introductory chapter from the vocational text you teach. Look for the vocabulary comprehension aids introduced above.

Formal Definitions

Pg. #	Term	Clue word	Definition
1			
2			
3			
4			

Synonyms

Pg. #	Term	Definition
1		
2		
3		
4		

Illustrations

Pg. # term	Pg. # Ill.	Terms defined by the drawing or photograph
1		
2		
3		
4		

Glossary

Pg. #	Terms found in the glossary (use each term only once)
1	
2	
3	
4	
5	
6	

Educated Guessing

Pg. #	Term	Clues
1		
2		
3		
4		

Teaching Students Vocabulary Skills

Vocabulary skills can be introduced in the two weeks and a half of class. Every-other-day one skill can be explained and an example given. Three or four more examples can be given on a transparency, ditto, or the board while the class locates the term and definition in a discussion. As part of their regular homework assignment, have students practice these skills. Select five words that you know are explained by the skill taught that day (synonym, formal definition, etc.). Have students prepare a sheet similar to the one you completed in the preceeding text application section for formal definitions, synonyms, illustrations, and glossaries. It is more effective, though, for work on educated guessing to be done in class discussions.

The cloze technique can also be used to reinforce or check the basic vocabulary skills. Prepare a clozed selection from your text, omitting important technical terms that are explained by one of the techniques discussed. This can be used to determine whether students use these comprehension aids or know the vocabulary. It can also be used to demonstrate to them the usefulness of learning these skills.

SECTION 4
PARAGRAPH COMPREHENSION

Section 4

Paragraph Comprehension

A paragraph has three major components:

1) the subject (what is being talked about)

2) the main idea (the most important information about the subject)

3) the supportive information (facts or examples that make the information clearer)

Of these, the main idea is the most crucial, for the key points of a chapter or article are simply selected main ideas from component paragraphs.

Look at the following paragraph, what are its subject and main idea?

> You now know that bacteria enter the body through the mouth, the nose, and the genitourinary tract. Each of these tracts has secretions that serve as barriers to bacteria. Thread-like cilia (hairs) and the mucous membrane of the nose are so effective in removing dust and bacteria that the lungs are kept relatively free of these microorganisms. There is an acid reaction to urine and vaginal secretions that prevents growth of most bacteria in the genitourinary tract. Digestive juices kill some of the bacteria that enter through the mouth, and the mucous membranes of the intestines are effective in keeping bacteria from invading the tissues. (Wood & Rambo, 1977, 45).

The subject here is "barriers to bacteria," because all parts of the paragraph speak to that topic in some way. In this instance, the main idea, the most important information about barriers to

bacteria, is presented straightforwardly at the beginning of the paragraph. It is: "the mouth, nose, and genitourinary tracts each has secretions that serve as barriers to bacteria." The rest of the paragraph provides further details, supportive information about the various secretions.

Paragraph Subject

The key to finding subject of the paragraph is locating the one topic that everything else in the paragraph is related to. A paragraph usually discusses only one small aspect of a larger topic, therefore, the subject must not be too general. It must identify the specific topic being discussed. At the same time, it must not be too specific, substituting an example of the subject being discussed for the subject itself.

Read this next paragraph from a nursing text and look for its subject.

> Preparation will begin on the evening before the scheduled day of operation, except in the case of emergency. Cleansing agents, either soap and water solution or one of the many proprietary skin detergents such as pHisoHex, will be used. As you have been shown previously, mild friction in washing is one of the most efficient ways to remove foreign material. Once the skin is cleansed the area is carefully shaved, because microorganisms stick to hair. The hair growth on many parts of the body is very fine and can be seen only in a brightly illuminated room. Therefore, make sure that your lighting facilities are adequate. (Thompson & Rosdahl, 1973, 311).

In this instance, students might choose "preparation for an operation" for the subject--one that is much too general. Conversely, they would pick one of the specifics mentioned, shaving for example, ignoring the other aspects of the paragraph. The correct choice of subject is "cleansing the body for surgery."

Exercise 10

Locate the subject of the following paragraphs.

The gluteal muscles form the seat or the rump. They are thick muscles on which you sit. They function to extend and to hyperextend the hip joint. Several strong, broad muscles attached to the pelvis and the thigh bone produce the flexion and adduction of the hip. The gluteals, hamstrings, and quadriceps are used in walking and other movements. When you are standing, they help to keep the femur, or thighbone, erect on the shinbone (tibia), which is the large bone of the lower leg. (Wood & Rambo, 1977, 70).

Subject: _____

The doctor usually prescribes a rectal tube, enema, Harris flush, or medication to stimulate the passage of flatus. As the patient passes gas, the distention is relieved, often within a matter of minutes. You can help relieve the discomforts of distention by helping the patient to turn frequently, and to get up if he is allowed to ambulate. Hot liquids and solid food help to reduce distention; but iced liquids seem to aggravate the condition. When the rectal tube is used, remove it after 30 minutes. The tube can be reinserted in an hour or

so if the patient becomes uncomfortable again. Positioning can help in many cases. Sims' position and the prone position make it easier to pass the flatus. Some patients may be able to use the knee-chest position for a short time to get rid of some gas, but most postoperative patients will not be able to tolerate this position during the first few days after surgery. (Ibid, 495)

Subject: _____

Paragraph Main Idea

Often it is difficult to identify a paragraph's main idea. The following four guidelines can help in its location:

1. If the paragraph includes the definition of a term, that term might be part of the subject. The definition might be part of the main idea.

2. If there are examples, these may be illustrating all or part of the main idea.

3. If a key word or phrase is repeated, it might be part of the subject or main idea.

4. Highlighted words might be part of the subject or main idea.

Note that the word "might" is used in each instance. These quidelines can point toward possible main ideas they cannot automatically select the right one.

Exercise 11

Look at the following four paragraphs. First ask yourself what the paragraph is about (the subject). Then look for the main

idea using the three guidelines. Note which guidelines (if any) are most helpful in each case.

> The most troublesome, if not dangerous, side-effect of the antihistamines in general is drowsiness. For this reason they should not be taken when working around machinery, when driving late at night, or at any other time when deowsiness could be hazardous. The sedative effort of these agents is greatly increased when they are combined with alcohol, tranquilizers, hypnotics, narcotics, and many antihypertensive medications; thus the combination of these agents is to be avoided. (Asperheim, 1975, 96)

Guideline #	Subject	Main Idea

> Illness is always a threat to adjustment. It interferes with the usual pattern of living, is very likely to be accompanied by discomfort, may involve doubt as to the outcome, and often creates financial problems. Patients and their families react to illness according to the degree of threat it represents. Adjustment is always poorer during illness. Sometimes behavior patterns which are not typical of a person appear during illness. Someone who is usually easy to please, for example, may be very difficult to please during an illness. A person who is usually quite well adjusted may show signs of poor adjustment when he is a patient. (Milliken, 1974, 97)

Guideline #	Subject	Main Idea

Fluid Balance. The body maintains fluid balance when the amount of water taken in approximately equals the amount of water eliminated. The fluids and foods of the diet provide most of the water needed each day. A small amount of water is produced during cellular metabolism as energy is released. Water is eliminated from the body in the urine, perspiration, feces and exhaled air. Some typical volumes of water intake and output for an adult in a 24-hour period are these:

INTAKE		OUTPUT	
Liquid	1500 ml	Urine	1400 ml
Food	800 ml	Sweat	500 ml
Metabolism	200 ml	Feces	200 ml
		Respiration	400 ml
Totals	2500 ml		2500 ml

This would indicate fluid balance for this person. The amount of fluid taken in and elimanated varies in health with the temperature, activity, and habits of the person, and other factors. So vital is water to survival that if fluid intake is decreased, the body will conserve fluid by decreasing the amount of urine secreted. This is an important fact for health workers to know. (Woods & Rambo, 1977, 347-348)

Guideline #	Subject	Main Idea

Patients with diabetes have difficulties using the sugars in food. Sugar is used by the body for energy. Insulin is a normal hormone produced by the endocrine cells called the islets of Langerhans, located in the pancreas. This hormone assists in oxidizing (burning) the sugars in the blood and maintaining the normal limits of blood sugar. However, in the diabetic patient there is less insulin - or none at all - manufactured by the body to aid in the process of burning sugars. A medication (insulin administered by hypodermic or an oral synthetic insulin) is given to the patient to assist him in using the sugars from foods. (Wood & Rambo, 1977, 313)

Guideline #	Subject	Main Idea

Paragraph Comprehension and Illustrations

Paragraph comprehension can be reinforced by the proper use of illustrative material. In medical assistance literature processes are often illustrated by sequential diagrams. Students must learn to "read" the diagram in its proper sequence and to relate each phase to the appropriate portion of the prose. The first two examples (Figures 14 & 15) utilize step-by-step illustrations to clarify the prose. If selections such as these are dittoed, students can practice integrating text and illustration by drawing lines from the words in the prose that correspond to each phase of the diagram.

Figure 14: Illustrations

Bacteria, under the favorable conditions about which we have learned, will reproduce by a method called binary fission. This means that the cell divides in half, as illustrated in the diagram below. (Ferris, 1974, 57)

Figure 15: Illustrations

A normal erythrocyte is a non-nucleated round cell that originates in the bone marrow from a nucleated cell which is usually called a rubriblast. Opinions vary as to the life span of an erythrocyte, but the mean is 80 to 120 days. Nonfunctioning cells undergo fragmentation and are then removed from the blood stream by the phagocytic cells of the reticulo-endothelial system. The phagocytic cells of the liver, spleen, bone marrow, and subcutaneous tissue carry on this process. Red blood cells carry oxygen from the lungs to the body cells and carbon dioxide from the body cells to the lungs for elimination. When they lose their ability to absorb oxygen and carbon dioxide, they become nonfunctioning (Fig. 6-8). (Woosley & Cuviello, 1977, 36 & 37)

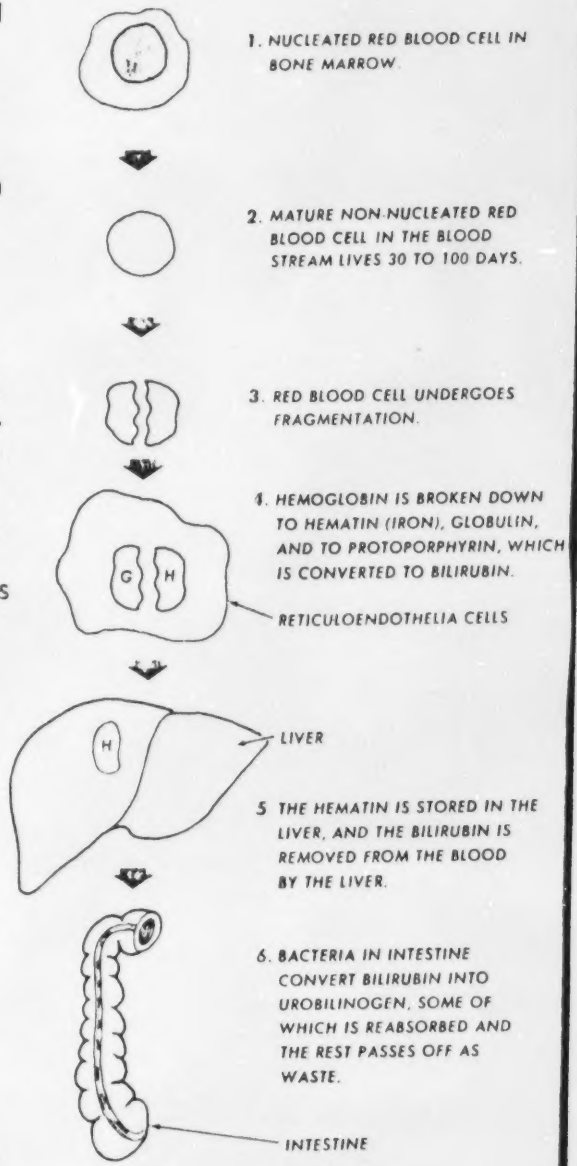

1. NUCLEATED RED BLOOD CELL IN BONE MARROW.
2. MATURE NON-NUCLEATED RED BLOOD CELL IN THE BLOOD STREAM LIVES 30 TO 100 DAYS.
3. RED BLOOD CELL UNDERGOES FRAGMENTATION.
4. HEMOGLOBIN IS BROKEN DOWN TO HEMATIN (IRON), GLOBULIN, AND TO PROTOPORPHYRIN, WHICH IS CONVERTED TO BILIRUBIN.
G
H
RETICULOENDOTHELIA CELLS
H
LIVER
5. THE HEMATIN IS STORED IN THE LIVER, AND THE BILIRUBIN IS REMOVED FROM THE BLOOD BY THE LIVER.
6. BACTERIA IN INTESTINE CONVERT BILIRUBIN INTO UROBILINOGEN, SOME OF WHICH IS REABSORBED AND THE REST PASSES OFF AS WASTE.
INTESTINE

Fig. 6-8. Life cycle of a red blood cell.

At other times, medical literature uses non-sequential illustrations to highlight the important concepts (usually the main idea) presented in prose that does not describe a process. Again, students should relate each part of the diagram with the appropriate phrases in the paragraph. (See figure 16)

Exercise 12: Textbook Application

Pick four paragraphs from you fourth week's reading assignment. Identify the subject in each.

	Page #	Column #	Para. #	Subject
1				
2				
3				
4				

Pick four paragraphs from your fifth week's reading assignment. Identifying the subject and main idea in each.

	Page #	Col. #	Para. #	Subject	Main Idea
1					
2					
3					
4					

Figure 16: Non-Sequential Illustration

Problems of Poor Body Alignment. Examples of poor alignment of the bed patient are shown in the adjoining figures. In the first, the patient's neck and back are flexed so that his chest expansion is reduced in breathing, and his feet are hyperextended, which may lead to foot drop and interfere with later ambulation, or make ambulation impossible.

Poor body alignment: neck and back flexed, feet hyperextended.

The second sketch shows the patient lying on his arm while on his side. The blood circulation is impaired in that arm. The other arm and leg are lying unsupported behind the patient, causing strain on the shoulder joint, and inward rotation (turning) of the hip joint. The pull on the muscles makes this position very uncomfortable for the patient.

Poor body alignment: patient lying on arm, other arm unsupported.

Avoid Muscle Strain. When the patient is supine (lying on his back), the pull and weight of his extended arms and legs cause strain on the muscles of the back, the abdomen, and the extremities themselves. Muscle strain in the supine position is most commonly felt in the neck, small of the back, elbow, wrist, knee, and foot. These areas are shown in the next illustration. Even the top covers of the bed put strain on the foot and toes of the patient when bedding is tucked in tightly or is heavy with blankets, or when the patient is weak and unable to move by himself. Although modern mattresses used in hospitals may reduce the strain felt in the small of the back, some patients will still experience discomfort in this area.

Supine Position: points of muscle strain.

(Woods & Rambo, 1977, 102)

Pick a segment at least four paragraphs in length from your sixth week's reading assignment and note the subject and main idea of each important paragraph.

Page #	Subject	Main Idea

Select three sequential or non-sequential diagrams that illustrate the main idea of a paragraph from the reading assignment for week five or six.

	Page # Ill.	Page # Prose	Subject
1			
2			
3			

Teaching Students to Understand the Paragraph

Understanding the paragraph is the most difficult reading skill the vocational instructor must teach. It is important to introduce the material slowly and incrimentally as was done here. The fourth week of class can be devoted to the paragraph subject. Monday 5-10 minutes can be spent in a general introduction and discussion/practice locating subjects in simple sample paragraphs. Wednesday the three criteria can be applied to more sample paragraphs and students can look for the subject in specified paragraphs from the homework reading. Friday a few of the homework paragraphs can be discussed and one or two more complex samples given. Friday's homework can include 1-3 more paragraph assignments.

During week six, a similar procedure can be utilized to teach locating the main idea. Each day one of the four clues can be introduced and applied along with the more general directions of "what is the most important thing the author is saying in this paragraph." The paragraphs you identified in the text application can be assigned to the students with directions to find the subject and main idea. In the sixth week the class can be assigned the multiparagraph sections you identified, recording the subject and main idea just as you did. They can also practice correlating illustrations and prose.

SECTION 5
EFFECTIVE READING TECHNIQUE

Section 5: Effective Reading Technique

In all subjects, the time comes when we ask our students to study by themselves. In many instances, these students do not know how to study. This section contains a brief overview and modification of a study technique originally devised by Francis Robinson.

The SQ4R Method of Study

Many elementary, secondary, and college students have not learned how to study a textbook assignment. A typical procedure is for the student to do nothing more than open his book and read the assignment. The more conscientious may follow this initial reading by a second or even a third reading of the same fruitless type. Research has found a good method of helping the student read a given selection with better understanding and better recall. It is called the SQ4R method. It involves six basic steps: (1) Survey, (2) Question, (3) Read, (4) Record, (5) Recite, (6) Review. Some of the things to be done in each of the six steps are discussed under appropriate headings below.

Survey:

> Look through the whole assignment. Read the headings if there are any; read the summary if there is one. Try to get the general idea of the content of the whole lesson. Later you can place the details into the framework which you have in mind, and the entire lesson will mean more.

Question:

Think of the questions which are likely to be answered in the lesson. Often the headings can very easily be turned into questions. Use them! If any heading does not tell you plainly what question is to be answered in that section use this question: "What does the author expect me to learn about from studying this section?" If there are no paragraph headings, skim the section quickly for the main ideas.

Read:

Study the lesson to find the answers to the questions. Do not stop to read every word carefully, concentrate on finding the main point. You cannot remember all the facts you find, so you want to look for the important ones, of which there will be only one or two for each section. Don't pick out too many. Do not try to memorize the facts at this point; just sort out the ones you need as you go along.

Record:

Make study guides. Fold or rule a large-sized notebook paper lengthwise down the middle. On the left, list the topics discussed in the book. If there are paragraph heading in boldface type, use them. If not, list the main ideas found in the preliminary survey. Leave space between topics. When you have finished reading a section and picking out the one or two points to remember, list on the right the key words of the ideas or facts you have decided are most important for each topic. Do not do this until after you have read a section and thought about it. This is most important.

Recite:

Go back over the lesson immediately. Cover the right hand side of the paper and check the headings on the left. Ask yourself, "Do I remember what this section was about?" or "Can I answer this question?" If you find that you cannot you know that you must look at the key words, or even go back to the book if necessary, in order to restudy the particular part which you did not understand or have forgotten. Step 4 is very important. Giving yourself an immediate quiz on what you have just studied is the best possible way to prevent forgetting.

Practice until you can recite on the entire study guide without referring to the key words. Then practice some more. This extra practice is what really pays off.

Review:

Some time later, and always before an exam, go back to your headings and questions and quiz yourself. Reread only those parts which you have forgotten. If you have taken steps 1, 2, 3, 4, 5, and 6 faithfully, you will find that you do not have too much to restudy.

If students learn to change the heading within a chapter to questions and then read to answer those questions, much more will be obtained, than if they merely read and then answered questions at the end of the chapter. Indeed, what often takes place when we assign questions from the chapter ending is students read the questions and then copy only that information which answers the question without ever having read the chapter or designated pages. The process of formulating questions is a thinking exercise which tunes students into the assignment. Reading, studying, in this way is a life-long skill that really should be taught. As a skill, it may be more important than the content and concepts of the subject. (Robinson, 1970)

Exercise 13: Textbook Application

Select a portion of the chapter you assign in the seventh of eighth week of class and practice the SQ4R method.

Teaching SQ4R

Students have already learned how to locate the subject and main idea of a paragraph and how to distinguish these from information that is merely supportive. In the final "paragraph" assignments they practiced recording information in much the same manner as they will for SQ4R. This should facilitate SQ4R instruction. On Monday explain surveying and have the students practice in class on the chapter currently assigned. Wednesday have them prepare questions from some of the headings, either individually or as a group. They can continue this exercise for homework. Friday the read and record steps can be presented and compared with the subject/main idea work they have already done. Reading and recording can be practiced on the homework assignment and disucssed the following Monday.

Teacher-made notes on the reading can be shown on a transparency, on the board, or a ditto to allow students to check their own notes. Wednesday the recite and review steps are introduced with students pairing-up to quiz each other from the left-hand subject column. Beginning Wednesday night, they should be expected to utilize the SQ4R method on their assignments. The next two Fridays, and sporatically thereafter, students can quiz each other on their notes while the instructor walks around the room noting whether each student has followed the correct procedure.

At the beginning of the next chapter, students should again be required to perform the survey step in class and suggest some guide questions derived from the chapter headings. Review of the other steps should take place as needed.

SECTION 6
RECOGNIZING AND RECORDING COMPLEX INFORMATION

Section 6

Recognizing and Recording Complex Information

Nursing assistance literature often highlights three important logical relationships: classification, comparison, and causality. Classification, in its simplist form is simply listing.

> Less frequently, the patient may develop 1) parolites, 2) urinary retention, or 3) hiccups (singulties) during the postoperative period . . . (Wood & Rambo, 1977, 496)

Comparison and causality are straightforward. Methods of sterilization may be compared in one book while another discusses common problems that occur as a result of vitamin deficiencies. These three relationships are easiest to see and remember if the notes taken about them have a visual impact. Each of these charting techniques is given below.

Classification

The use of classification can be signaled by a colon(:), number or letters, or words such as "these include." At other times classification is simply introduced by a statement: "there are three kinds of joints." Outlining is the easiest way to record classification.

Drugs Which Affect the Uterus

The uterus is a muscular organ with great power to expand or contract. The drugs which affect the uterus are those that increase or decrease this power.

Oxytocics. The drugs used to increase uterine contractions are called oxytocics. The commonly used ones are preparations of ergot and extracts from pituitary gland hormones.

Ergot is a dried portion of a fungus that grows on grain -- especially on rye. Preparations of ergot are used to promote the contraction of the uterus to its normal size after childbirth and to constrict the smaller blood vessels to prevent postpartum hemmorrhage. Some preparations are:

Ergotrate: Given subcutaneously or intramuscularly immediately after delivery; the usual dose is 0.2 mg., which may be repeated every 4 hours for 6 doses after delivery. Tablets for oral administration are also available.

Methergine: Resembles ergotrate in its action, but is more powerful, has more prolonged effects, and is less likely to raise blood pressure. The usual dose is 0.2 mg. given by injection or by mouth.

Side-Effects. Possible side-effects of these drugs are nausea and vomiting, dizziness, headache and diarrhea, and abdominal cramps. These are most likely to occur after large doses of the drug are taken, such as in attempted abortion. Severe poisoning may cause gangrene, brain degeneration, and blindness.

Posterior Pituitary Hormone Extracts. These preparations are given during childbirth to increase uterine contractions at the time of delivery; they may be given during a long labor when normal contractions fail to expel the fetus. They are also used to contract the uterus and reduce hemmorrhage after the placenta is expressed. Obstetrical Pituitrin and Pitocin are commonly used preparations available in ampules. The first is given subcutaneously, the second intramuscularly. The usual dosage varies from 0.3 to 1 ml. They are rarely used in the first stage of labor. Patients receiving these drugs during labor must be watched closely, with frequent checks of blood pressure and fetal heart tones. Prolonged contractions of the uterus diminish the blood and the oxygen supply of the fetus. (Thompson & Rosdahl, 1973, 367-8)

Drugs Which Affect the Uterus

I. Oxytocics - increase uterine contraction

A. Ergot preparations

1. Use

a. contract uterus after birth

b. constrict blood vessels and prevent postpartum hemorrhage

2. Kinds

a. Ergotrate

b. Methergate

3. Side effects

a. after large doses: nausea, vomiting, dizziness, headache, diarrhea, abdominal cramps

b. severe poisoning: gangrene, brina degeneration, blindness

B. Posterior Pituitary Hormone Extracts

1. Use

a. speed delivery (speed contractions)

b. reduce hemorrhage (postpartum)

2. Kinds

a. Obstetrical Pituitrin

b. Pitscin

3. Cautions

a. given during labor, must frequently check blood pressure and fetal heart tones (may reduce oxygen and blood to fetus)

II. Drugs to Decrease Uterine Contractions

etc.

Modified outline charts can also be constructed for complex information as Ferris and Skelly (Figure 17) do in Body Structures and Functions (1979, 8).

Exercise 14

On a separate sheet of paper construct an outline or outline chart to present the information Thompson and Rosdahl (1973, 362-4) give about drugs affecting stomach conditions.

Drugs Which Affect Stomach Conditions

Certain drugs are used to control the excessive production of stomach acids, to aid digestion, to relieve gas distention, and to cause, prevent, or control vomiting.

Antacids. Antacids are used in treating peptic ulcer to reduce and control stomach acidity and give the ulcer a chance to heal. Two widely used and readily absorbed antacids are sodium bicarbonate (ordinary baking soda) and sodium citrate, an ingredient of proprietary drugs for relieving stomach distress. The dosage depends on the needs of the individual patient. Many people have completely mistaken notions about stomach acid, not realizing that a certain amount is necessary for the digestion of food. The habit of taking sodium bicarbonate to avoid "acid stomach" can interfere seriously with the electrolyte balance in the blood and cause alkalosis (an excess of alkali in the blood). In the eyes of the public, advertisers have made "acid" an unfavorable term -- a public enemy to be fought.

Other antacids are often preferred because they are not readily absorbed and are not apt to cause alkalosis, although, in very large doses, they may severely upset the acid-base balance of the body. Some of the most commonly used ones are:

Aluminum Hydroxide Gel (Amphojel, Creamalin, Alkajel): In tablet or liquid form, it is given orally in does of 4 to 8 ml. every 2 to 4 hours. It is usually diluted in a small amount of water or followed by a drink of liquid to make sure the medicine is washed down from the throat into the stomach.

Figure 17: Modified Outline Charts

TISSUE	LOCATION	FUNCTION
1. Epithelial	Covering surface of body (skin) Lining nose, throat and windpipe, Lining of all digestive tract and many glands	Provides protection; Produces secretions
2. Connective		
a. Bone	Skeleton	Supports and protects
b. Cartilage		
(1) hyaline	Bone surfaces, ribs, nose, larynx, trachea	Supports and protects
(2) fibrocartilage	Intervertebral disks; joints	Supports and protects
c. Dense fibrous	Tendons, ligaments, membranes around bones	Acts as a cushion; joins muscles to bones and bones to bones;
d. Loose fibrous		
(1) fibroelastic	Encases organs; beneath skin	Holds organs together
(2) fibroareolar	Tissue interspaces	Acts as filler tissue
(3) reticular	Tissue interspaces	Acts as filler tissue
(4) adipose	Tissue interspaces	Acts as filler tissue; Cushions and insulates, Stores fat
e. Vascular		
(1) blood	In heart and blood vessels	Transports nutrients and wastes
(2) lymph	Fluid in tissue spaces between cells	Bathes the cells
3. Muscle		
a. Smooth	Walls of many organs	Provides for involuntary movement
b. Skeletal	Attached to bones, tendons, and other muscles	Provides for voluntary movement
c. Cardiac	Heart	Pumps blood
4. Nervous	Brain, Spinal cord, Nerves	Carries impulses

Ferris and Skelly. Body Structures and Functions, (1979, 8)

Magnesium Oxide (Light Magnesia and Heavy Magnesia): A powder insoluble in water. The usual dose is 250 mg. It is slow-acting but has a lasting effect. It has also a laxative effect which sometimes causes diarrhea.

Gelusil: Contains magnesium trisilicate and aluminum hydroxide.

Maalox: Contains magnesium-aluminum hydroxide.

Sippy Powders (No. 1 and No. 2): A mixture of antacids which are given alternately with a milk and cream diet, usually on an hourly basis.

Milk of Magnesia: A liquid mixture, sometimes combined with other magnesium salts as Maalox; the usual dosage is 8 ml. which is given with a small amount of water or followed by a small amount of water or milk.

Other antacids are Kolantyl, Aludrox, and Phosphaljel.

Digestants. Digestants aid digestion in the gastro-intestinal tract and supply digestant deficiencies.

Hydrochloric acid aids in the digestion of protein; it kills bacteria and helps to maintain electrolyte balance. Some people, elderly ones especially, are deficient in hydrochloric acid because too little is secreted by the stomach. This deficiency is associated with gastric carcinoma, pernicious anemia, gastritis, and other conditions. Dilute hydrochloric acid is given to remedy the deficiency. The usual dose is 4 ml., given in half a glass of water (through a tube because it injures tooth enamel). Eating food or using an alkaline mouth wash after taking it will help to kill its sharp, sour taste.

Acidulin: Another preparation containing hydrochloric acid which comes in capsules and is usually given before meals.

Pepsin: A stomach enzyme which aids protein digestion but is seldom used today because hydrochloric acid is considered more effective.

Bile Salts: A constituent of bile which is essential in the digestion of fats. They are used in the treatment of liver disorders to aid digestion and to increase bile drainage. Some commonly used preparations are Ox Bile Extract, Zanchol, and Decholin.

Carminatives. Carminatives are mildly irritating drugs which help to expel gas from the stomach and intestines. They are chiefly home remedies, such as peppermint water, and are either taken alone or are combined with brandy or or whisky in hot water.

Emetics. Emetics are given to make a patient vomit to rid the stomach of its contents, usually as first aid in emergencies when quick action is necessary (see Chapter 35). The drug apomorphine, given by injection, causes vomiting quickly but is a depressing drug when given in large doses. Gastric lavage (washing out the stomach) is the most effective way of emptying the stomach.

Antiemetics. Antiemetics are given to relieve nausea and vomiting. These symptoms may be the result of a number of things -- emotional distress, motion sickness, the effects of drugs, gastrointestinal disease, or reaction to x-ray or other treatments. They are sometimes relieved by simple remedies, such as a cup of tea, carbonated drinks (ginger ale, cola), sodium bicarbonate in warm water (to wash out the stomach), or gastric lavage. Quieting drugs (barbiturates) and the antihistamines are also effective. Common antiemetics are Compazine, Dramamine, Bonine, and Emetrol.

A common drug for the "morning sickness" of pregnancy is Bendectin. This drug contains Bentyl (an antispasmodic, which quiets the gastrointestinal spasms of nausea), Decapryn (an antihistamine, which controls nausea and motion sickness), and Pyridoxine HCI (which corrects vitamin B_6 deficiency, which often occurs in pregnancy). This drug is specially coated so that it can be taken in the evening and its effects will be maximal in the morning. The patient may become drowsy while taking this drug. (Thompson & Rosdahl, 1973, 362-364)

Comparison

While classification is commonly used in nursing literature, it is seldom used alone. Once the elements of a topic have been classified into sub-topics, these sub-topics are usually compared. Charts with the topics to be compared along one axis and the

features of comparison along the other are often provided. Again, if they are not provided, students may construct their own. When constructing a comparison chart, the complete comparison section should be read before beginning. (See Figures 18 - 19)

Respiratory Stimulants

The chief respiratory stimulants are carbon dioxide, caffeine, atropine, Coramine, and Metrazol. They act on the respiratory center in the brain and have been mentioned already on pages 347 - 348, under "Drugs Affecting the Nervous System." They are useful in a variety of respiratory diseases and disorders.

Carbon Dioxide: Carbon dioxide is a gas which increases the capacity of the lungs to take in oxygen and to expel carbon dioxide waste -- it deepens breathing. It is used to relieve asphyxia (suffocation) in carbon monoxide poisoning, to prevent postoperative pneumonia and to deepen breathing when anesthesia is used. It relieves postoperative hiccough; ordinary occasional hiccoughs, as well as hysterical hyperventilation, can be relieved by breathing and rebreathing into a paper bag held tightly over the mouth and nose. Otherwise, carbon dioxide is given by using a face mask attached to a tank of the gas. Overdosage causes difficult breathing (dyspnea), greatly increased movements of the chest and abdomen, and increased systolic blood pressure.

Caffeine: Caffeine stimulates the respiratory center. Some authorities believe that other stimulants now available are more effective.

Atropine: Atropine is often given with morphine to counteract the depressing effect of morphine on the respiratory center and to check mucus secretions and prevent spasm of the larynx.

Coramine: Coramine stimulates the respiratory center, increases the rate and depth of respirations and constricts surface blood vessels.

Metrazol: Metrazol stimulates the respiratory center and is especially effective in counteracting barbiturate poisoning. (Thompson & Rosdahl, 1973, 366)

Figure 18: Comparison Charts

Some antigens which are used for vaccine production are as follows:

Vaccine	Antigen	Inoculation
Cholera*	Nonviable bacteria	Two doses at seven to ten day intervals followed by one stimulating dose every four to six months by subcutaneous injection.
Diphtheria	Toxoid (modified form)	Two or three doses at four week intervals at age nine months followed by stimulating dose at six years if necessary.
Bubonic Plague*	Nonviable bacteria	Two doses at seven to ten day intervals followed by a stimulating dose every four to six months.
Whooping cough (pertussis)	Nonviable bacteria	Three doses at three week intervals at age one month or more.
Smallpox**	Attenuated virus	Introduction to skin cells by multiple puncture.
Tetanus**	Toxoid	Two doses at four week intervals. Stimulating dose at time of injury.
Typhoid**	Nonviable bacteria	Three doses by subcutaneous injection at seven to ten day intervals. Stimulating dose every six to twelve months.
Typhus*	Rickettsia	Three doses at seven to ten day intervals by subcutaneous injection followed by one stimulating dose every four to six months.
Yellow fever*	Attenuated virus	Subcutaneous injection

Figure 19: Comparison Chart

Respiratory Stimulants

Stimulant	Use	Cautions
Carbon dioxide	- relieve suffocation, postoperative pneumonia and hiccough, hysterical hyperventilation	- overdose causes difficult breathing and increased systolic blood pressure
Caffeine	- general respiratory stimulant	
Atropine	- counteract depression of morphine, check mucous secretion, larynx spasm	
Coramine	- increases rate and depth of respiration, constricts surface blood vessels	
Metrazol	- counteracts barbituate poisoning	

Exercise 15

Construct a comparison chart from the following selection on destroying micro-organisms. (Ferris, 1974, 84-5)

Cold Termperature

Cold, even freezing, is not a reliable method of killing bacteria. Low temperatures do retard their growth, thus preventing their ability to multiply rapidly and produce toxins. Therefore, the use of cold in some cases reduces the possibility of a disease advancing to a critical stage, but it does not cure the disease. An example of this is the "freezing" of the appendix by the use of ice packs. It is a temporary means of arresting appendicitis until conditions are favorable for the removal of the appendix. Freezing is a good method of preservation of certain foods, as it prevents the bacteria from carrying on their activities and causing decomposition and spoilage of the food.

Drying

Drying is useful in the prevention of the growth of bacteria because, as we have learned in Topic 10, moisture is a requisite for bacterial growth. Some organisms can withstand more drying than others, as for example, spore-forming bacteria.

How effective drying may be in killing orgamisms depends upon many factors or variables, such as the kind of organisms, the number of cells to be killed, the thickness of the article to be sterilized, the temperature used and the presence or absence of oxygen. Some bacteria, like those which produce meningitis and gonorrhea, are killed by drying within a few hours; tuberculosis bacilli can withstand drying for several days or longer.

Spore-forming bacteria can withstand drying almost indefinitely; one investigator reported that anthrax bacteria were alive after forty years of drying in a glass bottle. Therefore, drying is not a very effective method for sterilization but it does serve its purpose by killing most of the active forms of bacteria and is very useful for preserving milk, fruits, and cereals.

Light

Light, especially direct sunlight, has a destructive effect on living organisms on the surface of the skin and clothing. The visible rays of sunshine inhibit the growth of bacteria.

Ultraviolet light from lamps is one way of killing bacteria in the air of a room as well as killing some bacteria found in drinking water.

High Temperatures

Heat is by far the most effective of the physical agents of sterilization.

High temperatures are more destructive than low temperatures. Again, the length of time an article is subjected to the temperature is important; the longer the time, the more effective it will be in killing bacteria. The time is not counted from the moment the flame is lighted but from the time the particular, desired temperature or pressure has been reached. The higher the temperature used, the shorter the time required and vice versa.

The time and temperature combination required to kill a particular organism under laboratory conditions is called the thermal death time. Obviously, this will vary with each organism, with the number of organisms present and with the surroundings of the bacteria, such as the medium, amount of moisture, etc.

There are four distinct ways in which a nurse may use heat to sterilize objects. They are as follows:

Open Flame. An open flame of a Bunsen burner or stove may be used to sterilize objects which have come in contact with disease germs. We are all familiar with the common procedure of sterilizing a needle which is to be used to remove a splinter. We learned previously to sterilize the inoculating needle in this way.

Small articles which have come in contact with disease germs and which can be destroyed after use, may be burned. Such articles as paper handkerchiefs, tongue blades, sputum cups, swabs, cotton pledgets, dressings, magazines, and toys may be disposed of in this way.

Hot Air Oven. Dry heat from an oven can be used for sterilizing laboratory glassware, Petri dishes, sheets, towels, gauze, powders, fats, oils and waxes, needles and sharp instruments. Dry heat is less effective than moist heat so a higher temperature must be used; it would be 150° centigrade (320°F) for at least one hour to kill all bacteria. Dry heat is used for articles which would be injured by moist heat, such as gauze. Oils and powders used in medical treatment must be sterilized with hot air because steam cannot penetrate them.

Cause and Effect

Literature in nursing assistance often seeks to teach students to diagnose and correct common health problems. Such discussions are generally written in a cause and effect format. Again, a chart facilitates note-taking. In this case, causes are listed in one column opposite possible effects. The order of the columns is unimportant and columns may include subjects other than "cause" and "effect" (ex: "problem, symptoms, treatment.") (See Figure 20)

The bacteria which cause food poisoning may be one of the following:

Staphylococcus. Found in creampuffs, custards, milk, fishcakes, chicken salad. This germ may be transmitted by a cook or server who has a pimple, boil or lacerated finger in which these bacteria abound. Thoroughly clean hands and freedom from infection would prevent this.

Streptococcus. Food handlers suffering from septic sore throat may infect foods.

Clostridium botulinum. This produces botulism, a highly-fatal disease. This germ is an anaerobic one which lives in soil. Although the germ itself is harmless to us if swallowed, its toxins produced in foods which have been

improperly canned will cause death. Persons who eat spoiled sausages, or spoiled canned foods may get this disease. It can be prevented by

- o Processing food in such a manner so that all spores may be killed. (pressure cooker)
- o Heating any home-canned foods before tasting them. Boiling for 15 minutes destroys its toxins.
- o Discarding without tasting all foods which show any change in appearance or odor.

Antitoxin exists for the clostridium toxin but in order to be effective it would have to be given immediately after eating the food.

Salmonella. Causes paratyphoid fever, an acute illness of short duration. This may be transmitted by contaminated poultry, meat insufficiently cooked, raw eggs, raw salads, greens, cold cuts, fish, potato salad. (Ferris, 1979, 112)

Exercise 16

On a separate piece of paper construct cause and effect charts based on the following excerpt on the effect of heat and cold applications. (Wood & Rambo, 1977, 575-576)

These principles explain the effects of heat and cold on the body. Let us consider heat first. Heat is applied to the skin surfaces to provide general comfort and to speed up the healing process. The elevated temperature or fever that so often accompanies an illness or infection is the body's way of combating the illness and promoting the healing process.

Heat dilates the blood vessels in the area of application. This increases the blood supply, adds nutrients and oxygen to the tissue, removes toxins and excess tissue fluid, and reduces pain caused by pressure on the nerve

Figure 20: Cause and Effect Charts

Food Poisoning

Bacteria	Source	Effect	Prevention
Staphylococcus	food handler with pimple, boil or cut with bacteria		thoroughly clean hands and lack of infection
Streptococcus	food handler with septic sore throat		
Clostridium botulinum	spoiled sausage or canned food	fatal	discard spoiled food, boil home-canned food, correct processing
Salmonella	contaminated poultry, meat, raw eggs and vegetables	paratyphoid fever	

endings. The dilated blood vessels and the increased blood supply in the area of heat application cause the skin to appear pinkish or reddened, although this color is more difficult to detect in dark-skinned or black patients. Heat is used to decrease inflammation and to promote the formation of pus (suppuration).

Cold applications are used to prevent or reduce swelling, to stop bleeding, and to decrease suppuration. When cold is applied to the skin surface, it contracts the muscles, which in turn squeeze the blood vessels to reduce the blood supply further. The blood vessels themselves contract, the diminished blood supply reduces the nutrients and oxygen to the cells, and cell activity is cut down. Since cold applications slow the metabolism of the body, the body can be cooled for prolonged surgery to decrease the stress of trauma and blood loss.

Prolonged cold reduces sensation and therefore lessens pain. However, if cold continues to interrupt the circulation, it can lead to necrosis (death of tissue), as seen in severe frostbite. When a cold application is removed from the skin, there occurs a secondary reaction as the circulation returns to normal. The blood vessels dilate and give the skin a warm, glowing pink color.

Heat and cold treatments can be either dry, as with hot water bottles, heating pads, and ice caps, or they can be moist, as with baths, soaks, and compresses. Moist applications have a more effective action because water is better than air as a conductor of heat and cold. Dry heat is tolerated better than a moist heat application of the same temperature, which may cause pain or burning.

Applications of heat and cold to the skin activate the autonomic nervous system. The nerve endings in the skin send a message to the control center in the brain, for example, that heat has been applied. In an effort to maintain the body temperature at an even level, the control center acts to dilate the blood vessels and increase the circulation to the area. Other blood vessels to the internal organs are constricted so that the temperature of those organs is maintained to prevent disturbance of other delicately balanced body functions. Although the procedure of applying heat or cold to the body is relatively simple, the effect on the body is much more complex.

Heat and cold can be applied to large or small body areas. A general application is one that is applied to the entire body; a local application is one that is used on a specific part of the body. The following figures show some examples of general and local applications.

Exercise 17: Textbook Application

Select 3 paragraphs or sections from the text assignments for weeks nine, ten or eleven that include each of the logical relationships discussed above and complete a note chart on them.

Classification:	Pg. #	Topic
1.		
2.		
3.		

Comparison:	Pg. #	Topic
1.		
2.		
3.		

Cause and Effect:	Pg. #	Topic
1.		
2.		
3.		

Teaching Students to Recognize and Record Complex Information

Chart notetaking as demonstrated here can be introduced anytime after week six, whenever it is appropriate for your text. The three types of charts need not be presented at the same time. For convenience sake, it is assumed here that all will be introduced during weeks nine, ten, or eleven. Each form should be presented on a separate day. If your text already presents charts or outlines of these types, the appropriate one should be presented first each day followed by sample paragraphs or sections from which the students can construct charts as a class. Related homework assignments should be given as soon as the appropriate text selections are covered.

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2. Ibid. Support research demonstrates deceptive nature of mean as measure of central tendency in occupational curricular literature readability research.

3. Thornton, L. J. Overcoming Disadvantage By Reading Deficiency: The Cloze Teaching Technique. Journal of Studies in Technical Careers (Publication Pending). The material included herein was adapted from the above article and includes substantial direct quotation per copyright agreement provisions with the publisher.

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